The Builder.

VOL. XLVIII. No. 2196. SATURDAY, MARCH 7, 1885.

ILLUSTRATIONS.

Westminster Abbey.—Illustrations in connexion with Mr. Waterhouse's Lecture at the Royal Academy :—

Screen surrounding the Tomb of Henry VII., measured and drawn by Mr. H. O. Cresswell 338-339
Second Bay in Sacrarium, measured and drawn by Mr. E. Emlyn White 342-343
Interior Face of the South Transept, measured and drawn by Mr. J. Atwood Slater 346-347
Two Eastern Bays, North Walk of Cloisters, measured and drawn by Mr. T. McLaren 350-351
Westminster Abbey in the Seventeenth Century, from a Print by Hollar 354
Elevation of the Chapter-house Doorway, measured and drawn by Mr. E. C. Shearman 355

CONTENTS.

Railway Rates 327
Notes 328
Letter from Paris 330
Westminster Abbey (with Plan) 331
Architectural Association 333
Royal Institute of British Architects: Medals and Prizes, 1885 334
On Greek Architecture 334
Illustrations of Westminster Abbey 336
Central Association of Master Builders 336
Free Lectures to Artisans at Carpenters' Hall: Black, White, and Red Lead 357
Public Works at Brussels 357
Architectural Societies 357
The Folk-Lore and Art of Old Japan 358
Provident Institution of Builders' Foremen and Clerks of Works 358
Westminster Hall (with Plan) 358
Tredgold's Carpentry 359
Taxation of Surveyors' Charges in Compensation Cases 359
"Non-Acceptance of Lowest Tender" 359
The Royal Arms 360
Recent Patents 360
The Student's Column: Descriptive Geometry.—V. 360
Books: Laxton's Builder's Price Book for 1885 361
Recent Sales of Property 361
Meetings 362
Scottish Memorial to Archbishop Tait 362
Miscellanea 362

Railway Rates.

THE interest taken in this question is growing rapidly, and the national character of it is being increasingly recognised by the public at large. So long as it was regarded as a contest between the Railway Companies and Trade Associations, it attracted little notice outside commercial circles, but the more the Bills were studied the more apparent it became that there were few classes who were not more or less affected by their provisions; though to no class, perhaps, can the question be so practically important as to builders, contractors, and manufacturers and purveyors of building material, who are constantly sending heavy goods by rail all over the country. The columns of the daily press have been thrown open for the discussion of the subject, and much has been said on both sides upon the many points involved. As the question will now be shortly before Parliament, a brief sketch of the more important of these points, with a *résumé* of the arguments for and against them, may prove of interest. The nine companies who are introducing these Bills state that they are doing so in accordance with the recommendations of the Select Committee of 1881-2, and that they are framed generally so as to carry out the suggestions of that body. There is not the slightest doubt, however, that the Bill promoted by the President of the Board of Trade last year has stimulated them to action. In fact, the Chairman of the Great Western, at their half-yearly meeting, stated that their desire was to meet, as far as possible, the views expressed in the course of the negotiations over the Bill referred to. That measure was framed in compliance with the memorials of trade associations showing that Parliamentary inquiry into railway rates had become imperative, and, as Mr. Chamberlain had to abandon it, the present Bills may be regarded as the answer of the railway companies to the traders' challenge. We have already mentioned the four principal objections taken to the Bills, and may take these as heads for our remarks :—

1. That the companies are, by their Bills, seeking a general increase of their merchandise rates. It is a well-known fact, and one that is frequently brought forward in railway law cases, that the companies do not always charge the maximum rates authorised under the existing Acts. That is to say, they have a right to charge such high rates that in some cases they are too high to be enforced, — the traffic will not bear it. They now seek for confirmation of these powers, and, in some cases, for authority for still higher rates. The companies say that, in looking at the proposed rates, they should be compared with the maximum charges at present authorised, and not with the actual rates now in force, and that such a comparison would show but little difference except where their present powers are insufficient to pay them. They further say that they are willing to leave those cases in which they ask for increased powers in the hands of a Parliamentary Committee. In the present depressed state of trade this is naturally regarded with alarm. By the companies' own argument it is allowed that the present *actual* rates are below their statutory powers, and yet complaints come in from all quarters that these rates are excessive, and are destroying trade and driving it away altogether from various manufacturing districts. The companies, in seeking powers to retain, and in some cases advance, their maximum rates, give the impression that, so soon as opportunity offers, they will advance the present actual rates; and, though they claim to be merely framing simple and equitable mileage scales, there is no sign of any abatement in the opposition on this head.

2. That the proposed classification is improper and unjust to traders. The classification referred to is framed on the basis of the Railway Clearing House classification, which has been used by all the railways of any importance for many years. The legal classifications of goods are hardly worth the name, so few articles being enumerated. They are really of no service whatever, — except for lawyers to fall back upon in cases of disputed rates, when they find that it suits their purpose. The classification to be submitted to Parliament is elaborate and comprehensive, and makes provision for nearly all articles of commerce that can be mentioned. It is the result of the whole experience of the past, as the Railway Clearing House add to their classification every year new or hitherto unprovided-for articles of commerce. There are eight classes, viz. :—two for heavy mineral traffic, designated M (*a*) and M (*b*); special class (S) for other heavy and undamageable articles; and classes 1 to 5 for general merchandise.

This is a decided improvement upon the old system, and if the unfair provisions complained of were modified the rejection of the Bills on this count would not be advisable. In reality, the rates are at the present time governed almost as much by the Railway Clearing House classification as by Acts of Parliament, and had not the companies taken the opportunity of advancing certain articles a class higher there would have been but little objection to this clause; but they have taken the course just indicated; and this, it will be seen, involves a further increase in the freightage of articles so dealt with. In this matter, again, the companies rely upon a full inquiry in committee resulting in any defects in the classification being rectified, claiming that it has been compiled with great care and difficulty, in order to replace the antiquated measures regarded as useless by both parties.

3. That under the Bills preferential rates for foreign produce will be legalised and extended. This is hardly correct, as the question is not dealt with by the Bills at all. The point is, that it ought to be. We cannot conceive that Parliament would object to the insertion of clauses restraining the companies from continuing to give our foreign competitors this undue preference in the matter of freightage, if it is proved that home trade is thereby prejudiced. The companies look at it in this light. They are obliged (they say) to quote low rates for import and export traffic to large freighters to meet the demands of competing ports, and they do so without any wish to put home trade at a disadvantage. Mr. Oakley says these rates can equally be made whether the Bills pass or not, but he will find that this position will be assailed. Mr. Magniac's remarks upon this subject in a speech recently delivered at a meeting of the London Chamber of Commerce (at which Sir Edward Watkin was present) are very significant. He said that he considered it an injustice that a preferential rate should be given to foreign goods, and urged all commercial men to protest against this; and his remarks were received with applause. This point is certainly one which requires close attention, but we cannot see that it is affected by the measures under consideration.

4. That the right of the companies to charge station terminals will be recognised. This is the most important point involved, and the one upon which the opponents of the Bills seek their entire rejection. The companies claim the right to charge for services rendered at the forwarding and receiving stations, in addition to the mileage rates. As the law stands at present, they are only authorised to charge so much per mile, inclusive of all incidental services; but, as a matter of fact, they always charge for terminals,—that is, when dividing the receipts for through traffic, a certain sum is put aside to cover these services, the remainder being divided between the companies interested according to the distance conveyed. They are enabled to do this through the circumstance already dwelt upon, — viz., their powers being so frequently in excess of the rates employed. When called to account for

high rates, they can, in such cases as these, maintain their position by showing that they are within the limit. Sometimes, on the other hand, their powers are found to have been exceeded, and a statement is handed in showing how the rate is made up, when they try hard to get a judgment affirming their right to the items set down for terminals. Though the decisions of the courts have invariably been against the companies, one, at least, of the Railway Commissioners has confessed to considerable doubts as to the intention of Parliament with regard to these charges. We refer to Mr. Price, who, in delivering judgment in a case of this nature, stated that he was convinced that Parliament did intend to grant something for the use of stations at the time of passing the old Acts, but failed to express their intention in a sufficiently clear manner to enable him to give a decision in favour of the companies. After such remarks as these, it is but natural that the latter should redouble their efforts to obtain Parliamentary sanction for these charges; and accordingly clauses are inserted in the Bills under notice, to enable them to charge for terminals, the amounts to be such as the Railway Commissioners may consider reasonable. Now, as to the objections under this head. It must be remembered that these charges are to be in addition to the scale rates, it being allowed that the latter, in long distances, are too high to be used. It is, therefore, more upon short distances that the companies require power to add terminal charges. The opposition to the clauses is in consequence of the amounts to be added being left to the companies, subject to the approval of the Commissioners upon a case being brought before them. In this respect, the matter would remain as before,—a costly inquiry being necessary in every case to ascertain the opinion of the Commissioners as to the reasonableness of the demands. Recent law cases have shown that most exorbitant terminal charges are included in the rates. Again, when pressed, the companies will produce an analysis of the rate in dispute, showing the proportion going for terminals, to the sixteenth of a penny. This occurred in the case of Kempson *v.* Great Western Railway,—which case, it may be mentioned, has again been re-opened at the instance of the defendants, showing the wearisome nature of a contest of this nature. In this case the rate was, we believe, 8s. 4d. per ton,—it was certainly exactly so many pence per cwt. (thus being convenient for calculation),—and it is quite safe to doubt very strongly if sixteenths of a penny per ton were thought of when the rate was quoted. It naturally follows that traders look very suspiciously upon analyses of this kind. It is certain that the amount of terminal charges would vary considerably in the case of different stations; as the cost of construction and maintenance, local rates, &c., is very different. The cost of cartage, too, is a great factor in determining these charges, as in large towns this amounts to some two or three times the sum for which it can be performed in smaller ones.

Altogether the question is a very complex one, and a satisfactory solution of it would be very acceptable to all concerned. But, whether rightly or wrongly, everybody is afraid that the effect of the Bills will be to increase the already heavy charges for freightage by rail. It is beyond question that, if they chose, the companies could advance many rates forthwith, without waiting for new powers, and no legislation can be regarded as satisfactory that would, in the slightest degree, add to the yoke. The Chairman of the North-Eastern says that he believes that for certain articles reductions will be effected, and that the cattle tolls,—which, it was feared, would be advanced,—will remain unaltered. Mr. Oakley, the Hon. Secretary of the Railway Association, asserts that the companies have not the slightest intention of acting against the interests of trade or agriculture; but the opponents of the Bills remain unconvinced. Every day brings additions to their ranks, opposition coming from all classes. Not the least significant is that of the Common Council of London, who, on the 12th day of February, at a meeting presided over by the Lord Mayor, decided to oppose the Bills "in all their phases," and to communicate with other public bodies to secure united action. The same feeling seems to pervade all meetings held to consider the subject, except, of course, the half-yearly meetings of the Railway Companies themselves. The shareholders have, in most cases, had the principles of the proposed measures explained to them, and have agreed to the Bills being submitted; the London and North Western Company, however, having decided to hold a special general meeting for the consideration of theirs. The struggle will, doubtless, be confined to those interested in the matter, as Mr. Chamberlain, replying to a deputation which waited upon him in the early part of February, advised the opponents of the Bills to impress their objections upon their members, so that the latter would be in a position to submit them fully to Parliament. It may be inferred from this that the Government do not intend to interfere, Mr. Chamberlain, probably, having had enough trouble already over railway legislation. His suggestion is being carried out, and, at a meeting at Manchester on February 10, Mr. Agnew, M.P., was sanguine enough to assure his hearers that the Bills would never reach a second reading.

NOTES.

THE awards of the Institute of Architects for the Soane Medallion, the Tite Prize, and the Silver Medal for measured drawings of existing buildings, are mentioned in another column. The drawings have been on view at the Institute during the week. We concur in the selection in every case, but only with unmixed satisfaction in the case of the silver medal. Mr. Coxhead's drawings of St. Mary Ottery are an admirable set, representing a great deal of labour, and very well drawn. For the Tite Prize Mr. Campbell's design was the only one that could be selected; it is far beyond all the others in ability, but it is very French Italian, so to speak, and there is rather too much of the "Casino" style about it. Not one of the competitors seems to have realised what sort of thing it was which was intended to be promoted by the bequest of Sir William Tite, who would be rather aghast if he could see the kind of work which is supposed to come under the head of "Italian Architecture." Mr. Mitchell's Soane design hits best the idea of a municipal mansion, and has the most force and character of the set, though it is too palpable an imitation of the style of drawing and detail of an eminent artistic architect. "Acanthus," to which the Medal of Merit has been given, is a grandiose palatial Italian design, sufficiently suitable to the occasion. "Semper pulchrior" is a very elaborate and finely-drawn *rifaccimento* of Francis I. architecture, not unsuitable to the purpose; and there is character in the design "Weave truth with trust"; the drawing of the perspective barely does justice to the design. Most of the designs are a little too grandiose for the subject; and "Labor" is a town-hall rather than a mansion. It is a pity that the Council gave so many subsidiary medals for the measured drawings; several of the sets were very good; but to reward nearly all the competitors is lessening the value of the first prize.

THE thirteenth annual Congress of French Architects will open at the Hemicycle of the École des Beaux Arts, on the 8th of June, and close on the 13th of June. The programme will include some interesting visits, among others to the "Imprimerie et la Libraire Chaix," the hospital constructed at the cost of the Duchess de Galiera, at Clamart, the substructures and other portions of the Louvre, and the architectural monuments of Rouen. Among the papers and discussions, besides the notice of architecture at the *Salon*, and of the "Congrès des Sociétés Savants," at the Sorbonne, and the annual report as to prizes granted by the Société, there will be an archæological paper by a member of the "Académie des Inscriptions et Belles Lettres," a study on ceramic art, and a notice of the life and works of the late M. Paul Abadie. The programme of the Congress, which is in preparation by the secretaries of the "Société Centrale des Architectes," will shortly be published, giving the names of the architects who will direct the visits to buildings, as well as those of the readers of papers. A general meeting of the supporters of the "Caisse de Defence Mutuelle des Architectes" (now numbering 130) will be held during the Congress, for the purpose of settling definitely the constitution of that Association.

THE case of Spackman *versus* the Plumstead District Board of Works, which was before House of Lords on the 26th ult., is of considerable importance to builders. The appellant had erected certain one-story shops on the forecourts of some houses in Lee High-road, which were considered by the Plumstead District Board to be beyond the general line of buildings, and the Board took proceedings under the 75th Section of the Metropolis Management Act, 1862. On the hearing at the police-court, the magistrate, Mr. Marsham, decided that he was not bound to accept the certificate of the Superintending Architect of the Metropolitan Board of Works with regard to the general line of buildings in the road as conclusive, and that he was at liberty to decide a line for himself, taking into consideration the line of buildings in other portions of the road not dealt with by the Superintending Architect's certificate. The Plumstead District Board, being dissatisfied with this decision, asked for and obtained a case for the consideration of the Queen's Bench Division, who reversed the magistrate's decision, holding that the magistrate was bound to accept the Superintending Architect's certificate as final. This judgment was upheld by the Court of Appeal, the Master of the Rolls, however, dissenting. Mr. Justice Fry, in giving judgment, remarked that the Superintending Architect was, in his opinion, a better judge of technical questions than a magistrate, and that if his decisions were acted upon a more uniform practice would obtain with regard to lines of frontage than would be the case if the matters in dispute were subject to the judgment of different persons. This decision was upheld by the House of Lords, the peers present being the Lord Chancellor, Lord Watson, Lord Bramwell, and Lord Fitzgerald, and the appeal was dismissed with costs. The question will consequently be remitted to the magistrate to decide, in accordance with the finding of the Court of Appeal.

FEW of the many travellers in North Italy give heed to the wonderful system of irrigation canals in Piedmont, which yield 125,550 gallons of water per second, distributed over 1,680,400 acres of land, while those of Lombardy yield 95,355 gallons over 1,680,400 acres. The Cavour Canal, constructed within the last few years, draws its supply from the rivers Po and Dora Baltea, and has a flow of 29,200 gallons per second, watering 40,000 acres at a cost of 32,000*l.* per mile, or a total of 1,600,000*l.* Its volume is now to be increased by 5,300 gallons per second. A smaller subsidiary canal gives 18,540 gallons per second, and cost 24,154*l.* per mile. The canals in this district are not only used for irrigation, but also for motive power, by which the water is raised to higher levels. On the steep slope of the Dora Baltea near Turin, three canals,—the Torea, Agliano, and Rothe,—flow parallel to each other, though on different levels, the water of all these being used at the top of the hill, 62 ft. above the highest of them. A stream of 154 gallons per second is diverted from the Torea Canal, and carried down the hill by a lead pipe, until it meets the Agliano Canal. Here it is pumped up to the summit level by eight pumps, worked by four turbines driven by a fall of water taken from the Agliano, and allowed to fall into the Rothe, by joining which, it is available for irrigation. By this means not a drop is wasted. The Italian engineers have gone on the principle of constructing the works

on a vast scale, so as to have everything on a uniform arrangement, and avoid constant alterations, and by this means they have succeeded in utilising every drop of water and making North Italy a marvel of fertility.

THE mode in which not only architecture, but also landscape as affected by architecture, have been at various times profoundly modified by religious or political change, or by scientific discovery, is often overlooked. It was wholly ignored by many of the greatest Italian painters, who were wont to enrich their charming little views of Palestine in the time of Herod the Great with the turrets and spires of Catholic Italy. One of the latest examples of a silent but very noticeable change of the kind that has come to our knowledge is that of the introduction of corrugated iron, as a roofing material, into Southern Africa. Where springs or wells allow of the rich vegetation that rewards the industry of the Dutch colonists, among wastes of interminable sand, rise fruit or forest trees of exotic growth. Beneath their shade the farm-house,—the church, the store, the shanty, rise,—usually built of red brick, and roofed with plates of corrugated iron. As we can remember the first introduction of this material into our own country, some forty years ago, it is evident that this transformation of the African landscape must be of comparatively modern origin. Contemporaneously, and possibly with less obvious reason, the black and brown natives of the country have clothed themselves in European attire, shabby and ill-fitting trowsers by no means adding to the picturesque *ensemble* of the scene.

IN reference to the discussion on "Roof Coverings" at the recent meeting of the Institute of Architects, Messrs. Barton & Sons, of Broseley, ask us to call attention to the fact that data as to the behaviour of the old hand-made roofing tiles in bad weather would not necessarily hold good in regard to the same class of tile as now made by machinery, with the angles all mechanically equal. They add some practical remarks as to the laying of tiles, which may be useful:—"Care should be taken that the tiles are put close up to each other, or the consequence is that they overrun each other, and in a very short distance along the course the overrun is sufficient to cause a straight joint, which, of course, can never be weather-proof. As every one knows, there is a slight difference in the shrinkage in burning, and the tiles will sometimes vary a little in width, causing an overrun, but the introduction of a special made narrower tile at intervals will restore the truth of joint. In this neighbourhood many roofs are covered with seconds or even thirds tiles, not good enough for the market, but being laid quite dry without any rendering, pointing, or torching, but with great care as to breaking joint, the roofs are weather-proof."

THE owners of the Marylebone Theatre were fined 25*l.* on Monday last by Mr. De Rutzen for neglecting to comply with a notice served upon them by the Metropolitan Board of Works requiring them to make certain structural alterations to the theatre in order to secure the reasonable safety of the public. The alterations which had not been carried out were the removal of the whole of the dressing-rooms, lumber-rooms, and store-rooms under the stage and auditorium; the construction of an additional staircase to the gallery; and the removal of the handrail and balusters of the principal staircase and the substitution of a close balustrade of brick or stone.

A SERIOUS accident has happened at Bournemouth from the sudden fall of part of a building in course of erection as a hydropathic establishment, on the West Cliff. A local paper says:—

"Between thirty and forty workmen, including bricklayers, carpenters, and labourers, were at work there on Saturday, several of them being engaged on some scaffolding on the fourth story. Suddenly, and from some unexplained cause, the chimney-stack gave way, and carrying with it a large portion of a party-wall, together with an iron girder of unusual strength (about 7 cwt.), fell with a loud crash to the ground beneath, a distance of about 50 ft. The wooden joists of the two floors were, of course, completely smashed by the falling mass of brickwork, the weight of which is estimated at between eight and nine tons. Unfortunately five men were knocked from the scaffold, and fell with the brickwork, being more or less buried in the *débris* at the bottom. To use the words of a spectator, who, a moment before the accident, was counting the men at work on the building, the bricks came toppling down like a pack of cards, carrying the men with them."

From what we hear, we suspect that this was one of the cases in which buildings at Bournemouth (a great field of building speculation) are carried out by men who have taken up the trade of contractor without any of the special knowledge requisite to carry out buildings properly and safely. The injuries done to some of the men were very severe, and should any one of them not recover, we shall learn who is to blame; otherwise probably not. Should there not be a coroner's inquest on serious injuries as well as on deaths?

A CORRESPONDENT sends us the following advertisement:—

"BOROUGH OF LOUTH.—The Town Council will on the 10th day of March, 1885, APPOINT A BOROUGH SURVEYOR, at a Salary of 55*l.* No extras will be allowed.—For duties and further particulars apply to me. By order,
THOS. FALKNER ALLISON, Town Clerk.
Town Clerk's Office, Louth, 11th Feb., 1885."

What is the meaning of this? Is it expected that any one with the knowledge and experience to fill such a post adequately will accept such a salary?

THE Benchers of Gray's Inn recently pulled down and rebuilt the lofty wall on the west side of Gray's Inn-road, in front of Raymond's-buildings, but made no attempt to lighten its appearance by placing a dwarf wall and a palisade in lieu of the present wall, as they might have done. Looking to their indifference to the public advantage, it is perhaps too much to ask them to permit a glimpse to be obtained of their garden by the removal of the high wall on the south side of Theobald's-road, and the erection of a dwarf wall with an iron railing in place of the present unaccommodating enclosure to the garden. Let them call to mind what Lord Bacon, who once resided in Gray's Inn, says of the benefits derived from the contemplation of a garden.

THE Paris Society for the Protection of Works of Art (La Société des Amis des Monuments Parisiens) appears to be doing a good deal of work. Among the subjects considered at their last meeting were,—the restoration of the Porte St. Denis, the Hôtel Juigné (formerly the Hôtel Mazarin), the formation of a committee for protecting works of art by legislation, a hitherto unknown work of Philibert de l'Orme, the hemicycle of Delaroche at the Palais des Beaux Arts, the nomination of a committee to overlook future improvements and lines of frontage, a proposed site for the statue of Diderot, cleaning and scraping buildings, the arrangement of cemeteries, a communication from the English Society for the Protection of Ancient Buildings, topographical street names, and others. Among the members best known in England are MM. Cabanel and Yvon, as representing the painters, and MM. Garnier, Charles Lucas, Ruprich-Robert, Questel, and Vaudremer, as representing the architects. Through the intervention of the society, the Porte St. Martin is to be repaired instead of being restored, as was at first proposed; and the front of the Hôtel de Chimay, 17, Quai Malaquais, formerly the Hôtel Mazarin, which has been recently purchased by the Government for the purpose of enlarging the École des Beaux Arts, is to remain untouched. The courtyard of the hôtel is to be covered with a glazed roof, and will be converted into a museum.

THE *Bulletin Mensuel* of the "Société Centrale des Architectes" contains a notice of Mr. W. H. White's book on "Architecture and Public Buildings," by M. Charles Lucas. The book was noticed at length in our columns July 9, 1884. Our Paris *confrère* thinks that Mr. White may have taken a somewhat too pessimist view of the state of public architecture in England; but it is worth note, as the accuracy of the facts and conclusions about architecture in Paris has been called in question by some reviewers in this country, that M. Lucas especially commends the accuracy of the work, which, he says, gives a real authority to it; and he regrets that the book was not written by a Frenchman, or, at least, translated into French. It appears to have attracted a great deal of notice in France.

THE current number of the *English Illustrated Magazine* contains a very interesting article, both artistic and practical, by Mr. Geo. Simonds, the sculptor, on the system of bronze casting *à cire perdue*, the only system by which true justice can be done to a work of fine art in bronze. It is illustrated by some sections showing the way in which the moulds for large statues are built up, and the arrangement of the conduits for pouring in the molten metal. It is an article of real value and interest.

TWO important pictures illustrative of Biblical subjects were simultaneously open to private view last Saturday; paintings so utterly opposite in their object and method that there was a kind of unconscious irony in the coincidence. One of these, at the Gallery of the Fine Art Society, in New Bond-street, was Mr. Holman Hunt's painting of the "Triumph of the Innocents," his second painting of the subject; the first one having occupied him long years of struggle with a mechanically defective canvas, or rather sheeting, which strained and distorted the work. The first picture is now in the way of being made good; but, in the meantime, the second has been painted, and Mr. Ruskin says it is the greatest sacred picture of the day. We can only say this would be, to our thinking, tantamount to a confession that "sacred pictures" are things *passés*. The painting represents the flight into Egypt, with the addition of an attendant band of the spirits of the murdered "Innocents," very plump and fleshy little spirits; but forming a bright galaxy of movement and colour round the central group. The spiritual children advance on a flood of spiritual water, which has a way of rolling out into great spherical bubbles within which are portrayed future events. Joseph, with his carpenter's basket and spare shoes slung on his back, is turning round, so we are told, to see if there are any signs of pursuit. Signal fires, "still lighted in Syria in time of trouble," are burning on the hills. Dogs come out of the mill-house to bark at the passers-by, as we suppose they "still do in Syria." It is needless to say that there is a great deal of superb painting of detail in the picture, unsurpassable in this way in its thoroughness; a wondrous light in the stars, a conscientious thoroughness in the execution of minor details, for it is Mr. Hunt's work. But in regard to the intellectual objects of painting, it is a picture only suited to the interest of children, or persons of very childlike perceptions. It is melancholy to see such technical power and such earnestness of work expended on the production only of an illogical blending of superstitious legend with over-acted realism, which will lose all the little interest it has before the present generation has lived its life out.

THE other work referred to, Munkacsy's "Calvary," which is being exhibited at the Egyptian Hall, Piccadilly, and which is probably one of the largest easel pictures ever painted, is the very antipodes of Mr. Hunt's picture in feeling and intention. Munkacsy aims at giving the event as it may have happened, without any assumption of the supernatural in any way. In remarking upon his former large work, "Christ before Pilate," we spoke of the remarkable realisation of the various personages and types of men repre-

sented. This is hardly so strongly seen in the present picture. What one feels most strongly in it, perhaps, is the painful accentuation of the reality of the punishment of crucifixion, the most cruel mode of execution ever practised by a civilised people. The groups round the cross,—the women, the Roman soldiers, with their air of perfunctory attendance "on duty," and the Rabbis discussing the matter, are thoroughly and powerfully rendered. But the general impression left by the picture is that it is not so much pathetic as painful. It illustrates, however, to a certain extent, what we regard as the true attitude of modern painting in dealing with religious narrative,—the historical and human attitude rather than the mystical; but something more, no doubt, is required, and that something Munkacsy does not seem to possess. The picture has no feeling. The extravagant laudations of it in print, put into the hands of visitors, are in very bad taste.

LETTER FROM PARIS.

WE have already sufficiently noticed the industrial crisis which is throwing Paris off its balance, and it is unnecessary to insist on the desirability of opening as soon as possible the large labour-yards for the great public works which are needed. The question is not only an economic but a political one, and the situation is so grave that it is strange to find the Government so little occupied with it. The partial suppression of the fortifications of Paris, of which we spoke in our last letter, appears precisely the occasion ready to hand to furnish for a long time profitable employment to unoccupied labour. The uselessness of this fortified *enceinte* is by this time demonstrated, and the bastions constructed not long since by M. Thiers having proved unequal, in 1871, to the task of repelling the German army, have, in fact, served no one's purpose except that of the Commune armed against the regular Government.

Great disappointment has accordingly been felt here that, in spite of the promises of his predecessors, the new Minister of War has opposed his formal *non possumus* to the claims of the Paris municipality. All the plans which it had been in some way authorised to carry out, all the projects which it had preferred, are cut short by the veto of the Committee of Fortifications, and the question seems only too likely to be buried for good and all.

In the mean time, while the stoppage of work continues and the distress is general, we are looking here and there for palliatives. The directors of the leading journals of Paris have taken the initative in a *fête de bienfaisance* which is to be held on the 1st of April next. The Municipal Council have liberally put at the disposal of the committee the great range of rooms, scarcely completed, of the new Hôtel de Ville; there is to be a ball and a concert; the price of entry will be 20 francs, and 20,000 tickets will be put in circulation. The committee hope that, in spite of the pretty high price, curiosity will draw a great many persons, especially foreigners, to this monster *soirée*, of which the programme is really very attractive. We may add that M. Alphand, Directeur-Général de Travaux de Paris, is charged with the organisation of the *fête*. The name of this incomparable "metteur en scène" is a guarantee of success and of help for the poor of Paris.

Speaking of extensive works, we may observe that the contracts for the Gare St. Lazare, the enlargement of which we have already announced, have been let since 26th of February, and the work is now in full swing. This important work is under the care of M. Juste Lisch, Inspecteur-Général des Monuments Historiques, who is charged by the Compagnie de l'Ouest to construct a monumental railway station between the Rue d'Amsterdam and the Rue de Rome.

How long shall we have, each month, fresh losses to mourn in the world of art? This month it is M. Du Sommerard, whose reputation was European, and whose unceasing care from 1844 to his death was to increase the treasures collected in the Musée de Cluny by his father, in collaboration with whom he wrote that extraordinary work of erudition on *Les Arts du Moyen-Age*. M. Du Sommerard had succeeded Chas. Blanc as member of the Académie des Beaux Arts. His death leaves a great void, and the Government are in great difficulty about a successor to him at the Musée de Cluny. M. Alfred Darcel, Director of Les Gobelins, is, however, much talked of for the post. In that case, the administration of the latter establishment will be entrusted to M. Gerspach, chief of the Service des Manufactures Nationales.

The city of Paris, in its turn, has lost in the Comte de Liesville, joint curator of the Municipal Library, a patient collector, to whom we are indebted for the Musée de la Revolution, installed at the Hôtel Carnavalet. M. de Liesville, who had devoted his fortune to that curious collection of books, faïence, fans, engravings, and jewels, had besides deposited at the Musée de Sèvres and at the Union Centrale des Arts Décoratifs a crowd of objects of great interest. He has left to the Municipality his house for the purpose of founding a school of design.

We will not quit this sad obituary subject without a word for another modest and conscientious artist, L'Heritier, the celebrated comic actor, who died the other day at the age of 78, and who has gladdened the hearts of several generations of playgoers. He formed part of that pleiad of actors now disappeared, who have distinguished the Palais Royal Theatre, —Grassot, Ravel, Numa, Alcide Touzé, Gil-Pérez, and Hyacinthe. The latter still plays, in spite of his advanced age, but is only the shadow of his former self.

The theatrical question plays a great part here. More than any other, perhaps, the population of Paris is greedy of spectacle. It is true there has been lately a notable veering about of public taste, formerly directed almost exclusively to the drama. There is now a great run on music, and the popular concerts directed by MM. Colonne, Benjamin Godard, and Lamoureux are very successful. Accordingly, the municipal administration, wishing to satisfy these new tendencies, has resolved to request the National Academy of Music to give, with the aid of certain subventions from the municipality, thirty-six popular representations at low prices. The Municipal Council has looked favourably on this innovation, which will shortly be voted, and will permit slender purses and small fortunes to realise the splendour of the new opera house and the beauty of great Classic works hitherto reserved for a privileged class, at the same time that it will develope in the Republic the taste for serious musical art. This is not the only encouragement which the City of Paris has given to the art of music. It has instituted a great competition among all French artists for the composition of a grand symphony for orchestra, *soli*, and chorus. The scores to the number of seventeen are at present submitted to a jury of eminent composers, including Saint-Saëns, Mossenet, Delibes, &c. The successful candidate, whose work will be performed at the cost of the municipality, will receive also a prize of 10,000 francs.

From the Opera House at Paris to the Theatre at Nice is a transition the more easy since the new building, which was inaugurated on the 7th February last, is, in some sort, a copy of the work of M. Charles Garnier. It will, no doubt, be remembered that the Theatre at Nice was destroyed in the terrible fire which had so many victims. The construction which has replaced it is the work of M. Aune, who has directed his special attention to expedients for avoiding such a catastrophe in future.* The interior decoration is very rich, and special mention is made of the lighting apparatus, the lustres, brackets, and candelabra executed at the foundry of the brothers Thiebaut, from the designs of Jules Coutan, a young sculptor of great talent.

For some years past the civil buildings of Paris and its neighbourhood have been the object of very important artistic work, and an important competition, organised by the Department of the Seine, for the decoration of the Mairie, at Courbevoie, has just been decided.

The prize has been carried off by M. Seon, pupil of M. Puvis de Chavannes, who, after the first decision, had for competitors MM. Delahaye and Picard, pupils of MM. Boulange and Gérôme, and M. Chartran, pupil of M. Cabanel, and holder of the Grand Prix de Rome. The compositions of these different artists, which have been exhibited at the Hôtel de Ville of Paris, show much talent and technical ability; but these good qualities are spoiled by incredible faults of composition. There is, especially, a *mélange* of realism and allegory, which appears the more out of place because the public taste has drifted far away from the Classic reminiscences and Academic traditions of the École des Beaux Arts and the Villa Medicis. Thus, for example, to symbolise betrothal, one of the competitors shows us, by the side of a young peasant girl fully dressed in modern costume, a veritable Arcadian *berger*, scarcely covered at all with the traditional animal's hide. The result is a contrast the more absurd, that the artist has given, as framework to his eclogue, a landscape sketched from actual locality. This contrast of nudity and modern dress is not only ridiculous, but almost improper.

It is also as the result of a public competition that there was executed the monument to Ledru Rollin, which was solemnly inaugurated on the 24th on the Place Voltaire. The statue of the celebrated tribune is the work of a young artist,—M. Steiner. It occupies the pedestal on which, before the war, stood the statue of Prince Eugene, now installed in the Jardin des Invalides.

While we are awaiting the annual *Salon*, exhibitions follow one upon another. After that of the water-colour artists, of which we spoke, here is a Union of lady artists, painters, and sculptors, about to open at the Palais de l'Industrie its fourth exhibition, which comprises nearly 300 works. There are some remarkable things there. Among them may be mentioned the very original sea pieces of Madame Elodie La Villette, the paintings of Mesdames Besnard, Ronner, and Annie Ayrton. Among the sculptures we may mention those of Madame Léon Bertaux, President of the said Society, and of Claude Vignon (pseudonym of Madame Ronvier, the wife of the Minister of Commerce). The Society has consecrated two rooms to the work of a young Russian lady-artist, Mdlle. de Bashkirtsaff, who died recently, and whose mother is about to found an annual scholarship for a poor artist who has obtained an award in the *Salon*.

We may mention, also, the exhibition of the works of Gustave Doré in the Boulevard St. Germain (from the 2nd of March to the 2nd of April); that of the works of Bastien-Lepage, which will be very shortly organised on the Quai Malaquais, in the rooms of the Hôtel Chimay, which the State is shortly about to acquire in order to enlarge the École des Beaux Arts.

Lastly, from the 9th of March to the 9th of April, there will be held, in the Pavillon de Flore, an exhibition of works in black and white, which will include crayons, engravings, and drawings generally.

We are going to have at the Hôtel de Ville, where we are actively occupied with preparations for the great *fête* mentioned just now, a fine equestrian statue in bronze modelled by M. Fremiet. This eminent artist, from whom the Municipal Council have commissioned a grand candelabrum for the decoration of the State staircase, instead of confining himself to the ordinary vulgar caryatide holding a certain number of lamps, has conceived the happy idea of modelling a herald-at-arms, on horseback, in the costume of the fifteenth century, having on his body-armour the arms of the city executed in coloured enamel, and holding aloft a chandelier in his hand. This will give the principal light to the staircase. It is to be regretted that M. Fremiet has given to his work a green *patine* of a glaring tone which makes it look rather like plaster painted. But that is the one fault one can find, and it is not the less a bold work, of grand movement and frankly original.*

This "illuminating function" given to a statue recalls to our memory the celebrated colossal "Liberty" executed by M. Bartoldi for the City of New York. We learn that some Americans propose to offer to France, by public subscription, a reduction of this work, which will still not be less than 8 mètres in height, and will be set up in Paris, in the Sixteenth Arrondissement, Place des États-Unis. The statue will be cast at the MM. Thiebaut's foundry.

We conclude by announcing the recent creation, at the Gobelins, of a Museum of Tapestries, which will enable the public to appreciate the marvellous riches of our national manufacture. It is to M. Kaempfen, Directeur des Beaux Arts, that we owe the initiation of this excellent foundation, which will probably be of real service.

* An elevation and section of M. Aune's design will be found among the illustrations in the *Builder* of January 5, 1884.

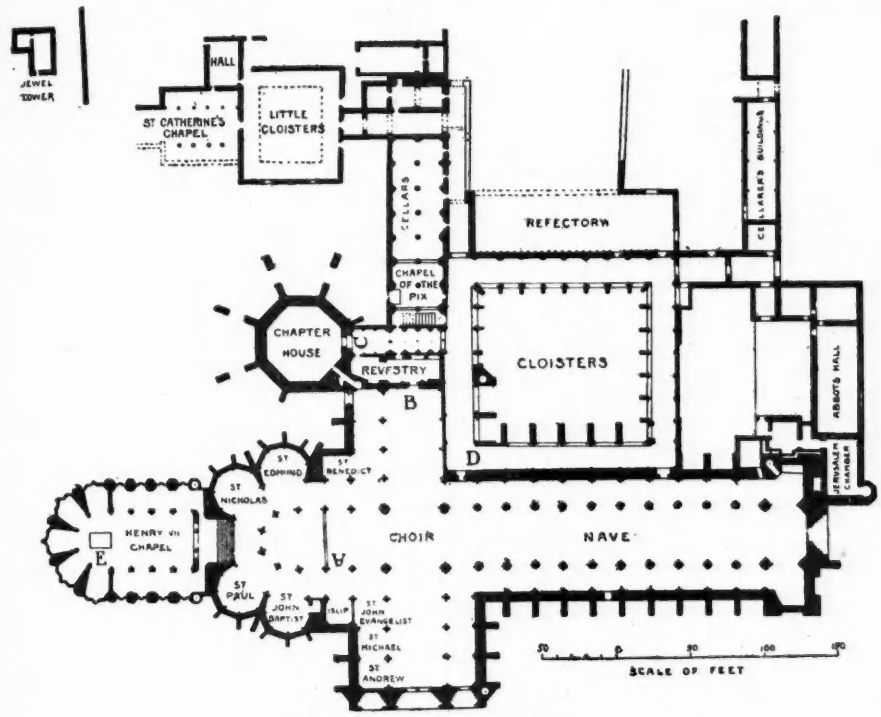
* We hope to illustrate this work shortly.

WESTMINSTER ABBEY.*

I HAVE taken our glorious Abbey Church of St. Peter at Westminster as the subject of what I shall have to say to you to-night, not because of the novelty of the theme, but because the abbey is in our midst, and because it has no equal either for beauty or historical associations, We, the present students and lecturers of the Academy, may contemplate afresh, for our own interest and profit, that noble pile, "the most lovely and lovable thing in Christendom," as Street called it, which has afforded so much instruction and delight to those who have preceded us in this room.

I must at the outset acknowledge my obligations to the works of Sir Gilbert Scott, who not only restored the unrivalled chapter-house and refitted the choir, but made the whole fabric and every treasure it contains the objects of his unceasing care and loving regard, and who was never tired, as Professor of Architecture, of bringing its beauties before the students of the Royal Academy, as the best illustrations of the marvellous Mediæval art to which he devoted his life.†

Any interest my lecture may have, will, I am sure, owe much to the beautiful drawings by Messrs. Vacher, Milner Allen, McLaren, and Slater, which are hung upon the walls. The plaster casts of carving in the Abbey, and



Plan of Westminster Abbey.

the specimens of stone and marble used therein, are kindly lent by Mr. Brindley. I am able to present you with seven hand illustrations, due to the courtesy of the Editor of the *Builder*. They are most of them reproductions of drawings made by pupils of the Academy.

First, I must give you in a few words the history of this remarkable structure. Our two great metropolitan churches sprang into existence almost at identically the same time. It appears that Ethelbert in 610 founded St. Paul's Cathedral at about the time when King Sebert, who died in 616, is credited with the first building of the church of the rival Apostle, St. Peter, on the then so-called Thorney Island. This was a tract, in part of peat and in part of gravel, covered with scrubby vegetation, lying between the Thames and the mouth of the brook Eye, which, flowing from Hampstead, passes through Tyburn (the Eye burn), and, disguised as a sewer, it is said, under Buckingham Palace itself, falls into the Thames where Great College-street runs into Abingdon-street. I need hardly repeat to you at length the familiar legend of the consecration of the church by St. Peter himself, on the eve of the day on which Bishop Mellitus, the companion of St. Augustine, was to have done it; nor how the angelic host who assisted as acolytes on the occasion left such tangible proofs of their presence in the droppings of their candles, as to remove all doubt of the veracity of Edric, the Thames fisherman, who acted as ferryman to the Apostle, and witnessed the supernatural consecration.

You will, doubtless, remember that Ethelred and his consort, the beautiful Norman princess Emma, took refuge from the Danes in the Queen's fatherland, Normandy. There their son Edward (afterwards the Confessor) was brought up, and after living twenty-five years in the Norman Court, and witnessing the erection of those imposing churches at Caen, which even now excite our admiration, was induced in 1041 to recross the Channel and re-establish in his own person the Saxon line on the throne of this country.

Edward rebuilt the church at Westminster in 1049-65, establishing there a Benedictine monastery in fulfilment of a vow. And, though little or nothing of his church, the first of cruciform plan erected in England, has come down to us, it is fair to presume that its characteristics were those of an early Norman church of enormous dimensions and daring construction, rather than of the last of those more primitive buildings, modest in size and rude in design, which we suppose to have been the rule in the Saxon period. In fact, we know from ancient contemporary documents that the choir was lofty, was vaulted, turned circular to the east (that is to say, was apsidal, had double vaulted aisles in two stories, one above the other, had a crossing or transept, with a lofty tower, whose timber roof, like the other roofs of the church, was covered with lead, and had five large bells.

That, further, the Confessor built a cloister, a chapter-house, vaulted and round, a refectory, a dormitory, and the usual monastic offices. Moreover, it appears that as the western end of the original early Saxon pile was left standing to avoid interrupting the services during the building of Edward's church, the latter must have been somewhat to the east of it. That Edward's church was conceived on a grand scale, and occupied, with what may have been left of the earlier Saxon nave, substantially the same ground as the present structure, is proved by certain structural facts, among others, by the remains of Edward's dormitory abutting against the present south transept wall in the usual manner, and also by the remains of the south wall of his cloisters, extending almost as far West as the present limits of the nave (and cloisters, I believe, always stopped in that direction short of the nave); and, lastly, by the fact that the Lady-chapel of Henry III., erected some years before he began the rebuilding of the church (and only pulled down to make way for Henry VII.'s Chapel), was placed adjoining the apse of the Confessor.

Of the buildings of the Confessor, nothing now remains to us but the Chapel of the Pyx, the cellars under the dormitory (now the Westminster School-room), the lower part of the walls of the refectory, on the south side of the cloister, and the bases of a column or two within the church itself, but the Bayeux tapestry gives us an outline of the Saxon church as it existed in its glory.

As the Confessor had made of the abbey a Royal Chapel, so Henry III. conceived the idea that the church should become a royal burying-place. At least such became his determination during the fifty years in which the Royal Abbey Church was in course of rebuilding. The king was fond of ritual. His visits across the Channel made him acquainted with the already achieved glories of the cathedrals of Amiens, Beauvais, and Reims. His enthusiasm for church services and for art combined to make his wish that his church should be incomparable for beauty, a natural one. Besides the native masons employed on the church, a host of foreign artists were invited to expend their skill on the monuments and furniture of the fabric.

In the course of his long reign Henry III. finished the Lady-chapel, the Confessor's shrine behind the high altar, the whole of the surrounding east end, the transepts, including the first bay westward from the crossing, and the chapter-house, with its vestibule and the revestry or Chapel of St. Faith. Edward I., his successor, erected the next four bays westward in the nave, the corresponding portion of the north walk of the cloisters, and the south end of the east walk beyond the part which belongs properly speaking to the south arm of the transept, and which, as carrying the triforium, was built naturally with it by Henry III.

The remaining six bays of the nave were erected by different abbots, Abbot Litlington in Richard II.'s time building the lower portion of the western towers. He also added the refectory or college hall on the Confessor's substructure, the abbot's house, the Jerusalem Chamber, and the rest of the cloisters; while on the north side he built Solomon's porch in front of the grand portal at the end of the north transept. In fact, after Henry III. we owe more to him than to any other of the abbey builders. While the nave was in course of construction Henry V. had erected his picturesque shrine over the ambulatory. The great west window appears to have been put in by Abbot Estney in 1498. In 1502 Henry VII. pulled down the Lady-chapel of Henry III., and erected on its site the wonderful mortuary-chapel which bears his name. The upper parts of the western towers were only completed in 1714 by Sir Christopher Wren. Before beginning to build he took down some of Litlington's work, shown in Hollar's view you have in your hands, and used the material thus at his disposal in repairing the south-western bays of the nave, putting the abbot's Perpendicular mouldings inwards. These have been discovered in the recent restoration, and will be useful in determining the real contour of the mouldings of the lower part of the tower.

Having now reminded you of the most important dates of the building, I must say a few words about the materials of which it is composed.

The stone most largely used in building the Abbey was the green sandstone called "Firestone" from its resistance to fire. It came from "Godstone" in Surrey,—a name implying the sacred use to which the stone was put. It was of a fine warm greenish yellow tone, and easily worked. Associated with it was chalk from the lower beds at Merstham in Surrey, and elsewhere,—an excellent material when kept from damp, most perishable when subjected to it. The excellent effect of colour produced in the filling in of the vaults both in the cloisters and the church itself is due to the alternate banding of these stones. In addition, the curious in such matters may find *tufa*, a coarse, loosely compacted, and very light limestone used in the east wall of the dormitory, where the Westminster boys now have their gymnasium. Caen stone was also used, or an oolite from Normandy very like Caen, which was really one of the most easily procurable stones for building in London, owing to the difficulties of land transit in those days.

The Early Norman ashlar work of the Confessor is easily to be distinguished by its surface being covered by coarse diagonal tool marks, and by the wide mortar joints between the squared stone, ¾ in. and sometimes ½ in. wide. The corresponding work of the Plantagenets, on the contrary, is characterised by fine vertical tool-marks, and by thin ¼ in. joints.

* A lecture by Mr. Waterhouse, A.R.A., delivered to the students of the Royal Academy on Wednesday evening last.

† To his son, Mr. John Oldrid Scott, I am indebted for the loan of most of the large drawings on the walls, which were prepared by his father to illustrate papers read here or elsewhere.

In addition to the fire-stone, the chalk, the tufa, and the Normandy oolite, which appear to have been used by all the great builders of the abbey,—Edward the Confessor, Henry III., and his successors,—Purbeck marble was largely employed for the detached shafts and frequently for both bases and capitals, sometimes also for the piers themselves, though, owing to its extreme hardness, it was seldom used when elaborate carving was intended. There is a notable exception to this in the central pier to the Chapter-house, which has a splendidly-carved capital in Purbeck. The old Purbeck was much richer and more varied in colour than that now to be obtained. A sample of the original polish still lingers in the Chapel of St. Michael, north transept. It was introduced also into the pavements for steps, and, as you will see, it played an important part in the priceless pavements of the shrine of the Confessor and the Sacrarium. Owing to its decay externally Sir Gilbert has substituted for it a Derbyshire fossil marble in the new north porch.

Abbot Litlington, in the fourteenth century, appears to have used Roche Abbey stone, and Abbot Islip in the sixteenth, an oolite from Oxfordshire, in the north-west tower. In the upper part of the western towers, rebuilt by Sir Christopher Wren, Portland stone was employed. This stone, though too cold in colour, is unequalled for durability in London, and its use was continued, as I find the six western clearstory windows on the south side were rebuilt externally with it in 1730. But the surveyors of the abbey after Wren, Dickinson (who restored the great rose-window of the north transept and who lies buried within the north porch), and Tufnel, are said to have employed, in their day, the Oxfordshire stone. The so-called restoration undertaken by the latter surveyor was, after all, chiefly demolition, for it was he who scraped off the exposed surface of the stone externally to get rid of the decay, thereby destroying the contour of the mouldings, reducing their size and effect, and, by exposing another surface to the corroding air, leading to the necessity, in our day, of replacing much of the masonry with entirely new work to save the fabric from utter ruin and accident to passers-by.

Sir Gilbert Scott appears to have used Ketton or Mansfield Woodhouse stone in his excellent restoration of the south walk of the cloisters, Tadcaster in the west walk, Bath for the front of buttresses north side of nave, Tisbury in the Chapter-house, and Chilmark from the Trough or Wardor beds elsewhere.

This latter admirable stone has been selected by Mr. Pearson, the present architect, for the works he has now in hand.

You will see, therefore, that Westminster Abbey is practically a geological museum of the greatest interest and value to the architect practising in London, enabling him to watch the effect of its climate on almost every description of building stone in common use, except it be the millstone grit and other sandstones so much used in the North.

The terrible effects of our present climate upon stone are strikingly exemplified by an incident which occurred in taking down the Chapter-house. There some ashlar was found of Henry III.'s work, with delicate masons' marks or scratchings which had been exposed for three centuries without any deterioration, and afterwards cased with brickwork. When discovered by Sir Gilbert these stones were again used in re-building the Chapter-house with their old surfaces again exposed, but the nineteenth-century atmosphere of Westminster destroyed the marks in less than a year. There were no potteries in Lambeth in the early days of the abbey; now the abbey officials declare they know glazing days at Lambeth from the sulphurous taste of the air.

The danger of using lead in joints is strikingly shown in various parts of the fabric,—at least, molten lead. Sheet lead, as now used, would not have done the mischief we have to deplore, —the destruction of so many of the neck-moulds of the smaller capitals. The material destroyed is Purbeck marble, a calcareous stone. The lead was applied through a small hole drilled in the bell of the capital. The heat of the molten metal, doubtless partly calcined the stone, and rendered it friable. The weight which the capital had to sustain gradually squeezed out the lead, which, curling up, has in numberless instances broken off the delicate neck-mould.

You will notice the tie-rods which go from pier to pier in the east end of the church and at the crossing. These were built in originally, and go right through the piers; for it will be observed that these rods do not keep to an exactly uniform horizontal line around the church, the upper rods terminating in eyes which drop into hooks forged on the heads of the lower rods, which pass through the piers. In the Chapter-house when taken down, they were found, as the strain was not direct, to be attached to rings embedded in the masonry of the piers, the attachments being made in the same way with hooks and eyes. In one part of the ambulatory rods of oak, about 5 in. square in section, are wedged in between the caps of the columns, their ends abutting against lead pads. These rods have the reputation of being 400 years old, and probably took the place of the wrought-iron rods where likely to be subjected to compression merely in case of any bulging of the masonry, and not to tensile strain.

Two courses of 1½-in. chain bond go right through the walls, one at the springing of the arches of aisle windows, and another half-way down the windows. Across the glass they acted as stay-bars to the glazing. No doubt there are other courses of ties in the walls at greater altitude.

As before mentioned, there is an interesting morsel of the early church of the Confessor yet remaining, but quite concealed from ordinary observation. Just in front of the tomb of Edward Crouchback, on the south side of the sacrarium, is a trap-door of marble in the modern pavement. If that be raised, and a light lowered into the dark space below, the first course of the drum of a column, with a base of two shallow circular members on a square block, is seen. That is part of the church of the Confessor. This late discovery proves two things; that his nave was narrower than the present one by 10 ft., that the pavement of it was lower by 3 ft. or 4 ft., and taken in conjunction with the base of another column discovered *in situ* also on the north side, that the lines of the arcade converged rapidly towards the east. This is a remarkable arrangement, and was most likely productive of a happy effect when looking towards the altar. Though Edward's nave was thus only about 28 ft. wide, his bays, if the one in question may be taken as a fair specimen, were 18 ft. 9 in. centre to centre, instead of 17 ft., the average dimension of one of Henry's bays, but then they were spanned by semicircular, not pointed, arches.

To return to the building erected by Henry III. in the middle of the thirteenth century, to us the centre of attraction. It is peculiarly fortunate for us as Englishmen that the Royal Abbey Church was rebuilt when it was. Reims, Beauvais, and Amiens had just reared their splendid cathedrals, in which the Romanesque, or round-arched Gothic of the twelfth century, had given way, by an entirely natural and logical series of changes, to the fully-developed Pointed style. This effected all at once a revolution in architecture in this country, as in France. In English work, however, the windows, as a rule, were kept detached, singly or in groups, and were emphasised or adorned by a profusion of surrounding mouldings of exceeding delicacy and beauty, the use of the circular abacus in the capitals adding to the elegance of the work. It was only when the openings were unglazed (in the triforiums or the belfries, for instance) that they continued to be grouped together under a comprising arch, and divided by detached shafts, as in the earlier Romanesque or Norman style. Glazed windows in England were then mostly of single lights. While the English builders were perfecting their single lights, the French were turning their attention to the mullioned and traceried window. At first their efforts were somewhat clumsy,—at any rate, when they forsook what is called "plate" tracery. The piercings in the window-heads consist exclusively of geometric figures, as circles, quatrefoils, or cinquefoils. At length at Reims, in the middle of the thirteenth century, or rather earlier, our neighbours the French achieved a great success in what is called bar tracery. In the two-light window of the apse there we find not only the head filled with a circle subdivided by six cusps or foils; but in addition the spandrels and gussets are all pierced, and the mouldings of the mullions are carried all round the circle, as well as the two main divisions of the window.

It appears, therefore, that we are indebted to French architects for this bar tracery, and that in all probability because our own artists were concentrating their energies in another direction and achieving results equal to, or surpassing in beauty, the efforts of their French brethren. Our neighbours in the same time were developing another feature very characteristic of their productions when compared with our own, the chevet round the apse, handed down to the thirteenth from the preceding century, but discarded generally in England, we should suppose from its interfering with the splendid grouping of our Early English windows, which could only be fitly displayed in a flat wall.

In all probability the Confessor's church had simply an apse, terminating the eastern end of the cross, with square ends to the aisles, after the plan of St. Stephen's, at Caen. Soon after this, however, the aisles were continued round the apse. We see it in our own Norman and Transitional work, as at Norwich and Bury and at St. Bartholomew's, Smithfield, but rarely afterwards.

The French then began to group around their chevets a number of radiating chapels arranged as polygons, so that they exactly fitted each other; their axes radiating from the centre of the apse. This involved great complexity of plan, produced varied effects of light and shade, and was brought to perfection in Reims, Amiens, Beauvais, and in other churches founded on these. These three great examples were probably the churches which served as Henry's models; for, though the Lady-chapel was begun in 1220, the rebuilding of the church itself did not begin till 1245, after Amiens had been twenty-five years in building. It would appear probable that Henry's English architect had been sent to study these stupendous works, for the new abbey took their form in apse, chevet, radiating chapels, and bar-traceried windows of the Reims type, though in detail it was essentially English. The bar tracery, if this were, indeed, its first introduction into this country, took ultimate root here; not so the radiating chapels, of which there is hardly another example.

The difference of plan is interesting. In Reims the chevet follows the five sides of a decagon, and is a very simple affair. Westminster, on the other hand, is more complex and beautiful in effect. The sides of the apse are five in number, as at Reims, but instead of being five sides of a decagon the three easternmost are sides of an octagon, and the others incline slightly to meet the octagonal end from the straight sides of the church. This is very subtle, and gives a gentler transition from the straight walls of the main arcades into the circular form of the apse. This is one of the lessons which the abbey gives to the architectural student. This peculiar plan, you will observe, also prevents the apsidal arcade being so crowded as in the French churches, because to the east of the transverse line from the centre of which the apse proper radiates there are but two semi-arches and three whole ones, four altogether, instead of five as at Reims; and the same holds with regard to the arches opening into the radial chapels, which are thus much wider than the ordinary bays of the church, whereas at Reims they are the same width.

At Cologne the apse takes the form of half a dodecagon. It is consequently very crowded, the arches not being twice the width of the piers, except the two first bays, which are only half in the apse, and which fall inwards, as at Westminster.

No French example that I know of presents so cunning a treatment of the apsidal east end, except it be St. Ouen, at Rouen, which follows the Westminster treatment at a much later date. In another very important particular the church differs from the usual arrangement. The triforium, instead of being covered with a sloping roof descending from below the sills of the clearstory windows to the parapet over the windows of the aisles, has a flat timber lead-covered roof. Was it ever intended to vault this triforium roof? I think so, as we see in the earlier parts of the gallery detached shafts against the piers between the open arcading, and which stop suddenly below the roof. The triforium thus formed might have been in imitation of that which existed in the church of the Confessor, as such features were not uncommon in Romanesque work, and were used for the accommodation of worshippers where not so elevated from the floor of the church as is the case in our present abbey. Whatever may have been the motive in giving such dignity to the triforium, there is no question as to its beauty in itself, at any rate internally, or to the

bewildering charm of the views of the nave and apse when seen from the parts of the triforium near the crossing. At this height the spectator is not so much distracted by the garish modern monuments, and he is able to calmly contemplate the unity and splendour of the fabric itself. The triforium is lighted by windows whose equilateral arches spring from their sills without any intervening jambs, and are filled by three circles, each decorated with an inner order arranged as a cinquefoil like almost all the other tracery of the abbey.

The triforium arcade is perhaps the most noticeable feature in the church. Its richness and complexity is due to its being double. Each bay has two principal arches, with beautiful carving or diaper on the voussoirs. Within each of these arches are two others, delicately moulded, supported by a detached central shaft of Purbeck, with cap and base of the same material. These inner arches are cusped, and support a circle enclosing the customary cinquefoil. Behind all this, and detached by the distance of 2 ft., is its exact counterpart. In neither range of arches, however, has "the lamp of sacrifice" guided the builder to mould them on the triforium side, except in that part of the nave erected in Richard II.'s time. Seen from below, nothing can exceed the beauty of this triforium. It is perhaps a trifle too beautiful for so great a repetition. Through the courtesy of Mr. Vacher, you can compare this triforium with that of the Angel Choir at Lincoln, in his two remarkable drawings.

The abbots in Richard II.'s reign built the four westernmost windows of the triforium on the south side, and it is curious to observe that they have reversed the cinquefoil tracery in the heads of these windows to their more usual position, with a circle at the crown, whereas the previous builders had for some reason placed a cusp at the crown and a circle at the base of each of these figures. This was a rather bold departure from precedent for the abbey, where one does not observe many of the usual characterisiics of the architecture of Edward I. and Richard II., owing (to their praise be it mentioned) to their setting aside their natural predilections in favour of the style of their day to secure the unity of the building. Both Edward and Richard, therefore, though employing their own mouldings, carried the main features of the Henry III. work right down the nave, so that there is no break in the grand rhythm of the building, though, on careful inspection, there is no doubt as to where each builder began and left off. The story they told was exactly Henry's story, but the language used was their own. In the south and west walks of the cloisters you see exactly the same restraining influence at work. The openings are filled in with the geometric forms of a previous century, but the caps of the columns and other details are of Richard's own time, so that, though the student would not go to Westminster Abbey to learn the ordinary progression of the styles, he may go there with profit to learn the far higher lesson of how to sink self in labouring with others in a common cause.

Another slight change in the mode of treatment may be remarked in these cinquefoils of the triforium. Edward, and indeed Henry, did not put bosses to the tips of their cusps, but Richard did. Wren, when he restored Richard's work omitted them. Perhaps he did not care for Gothic carving, nor for Gothic mouldings. In fact, we know he did not, since he replaced with hideous acorns some of the little capitals on the window mullions. These are being replaced, and with excellent effect by Mr. Pearson on the south side of the nave, also the sensible mouldings of the great quatrefoils which in the fourteenth century took the place of the cinquefoils in the heads of these aisle windows. These mouldings die away on a broad splay towards the lower part of the quatrefoil, where they would not be seen from below, and where they would interfere with the proper throwing off of the rain.

The two last triforium windows west (south side) appear never to have been glazed. The masonry was finished, and then subsequently they were bricked up, for what reason does not appear. Wren wanted to return one of his classical intermediate cornices against the last window, so he removed a few of the bricks and mitred his cornice into the moulding of the window, of course in a workmanlike manner, but did not remove more of the brickwork than he could avoid. He left that to Mr. Pearson, who has glazed them for the first time.

After the triforium perhaps the most beautiful feature is the wall arcading. Observe the beauty of its mouldings, of its bold trefoiled pointed arches, the plain spandrels between these and the circumscribing arch having once been resplendent with colour. The larger spaces or spandrels over these circumscribing arches are filled with exquisite sculpture, either conventional or natural foliage with here and there a figure. The capitals also of the slender Purbeck shafts of the arcading carry sometimes natural foliage, sometimes conventional forms, and in some of these latter Sir Gilbert Scott thinks he discovered the hand of a French carver, from the stalks carrying, not as in English work of the time, conventional, but little tufts of natural foliage, as at the Ste. Chapelle, and in other French work of the middle of the thirteenth century. In other capitals you will find the naturalism more avowed, and leaves and stalks flung more carelessly on the bells of the capitals, which, however, whether carved by English or French workmen, had always their delicately-moulded circular abacus.

I have before spoken to you on the subject of architectural proportion based on geometry, disparaging to a certain extent the idea that certain relative dimensions in the height, length, and breadth of interiors are productive of beauty, inasmuch as it is quite possible to make two apartments of exactly the same relative dimensions, of which one shall be of acknowledged perfect proportion and the other hideously the reverse by simply unduly emphasising some of its subordinate parts either by exaggerated size, proportion, or depth of mouldings, or by striking contrasts of colour. On the other hand, though, perhaps, not so easily, it will be possible by the same means to impart to an interior a satisfactory sense of proportion, which might hitherto have been lacking. It is astonishing how little change is required to alter not only the architectural, but the acoustic effect of apartments of exactly the same size and proportion. In my own experience, a curious instance of this is in the Manchester Assize Courts, where the two principal courts are of precisely the same size. One of them has always borne a good character for its acoustic properties, whether comparatively empty or crowded; the other has to be filled in order to be satisfactory in this respect. The latter is divided into seven bays longitudinally, by five transversely; the other, the success, into five by three; but then the latter has a large massive central gaselier which breaks the sound waves, the other four very attenuated specimens of Mr. Skidmore's art.

Though, therefore, I do not think that mere general proportion can ever be insisted on as an infallible guide to success, either in architectural beauty or acoustic excellence, it is well worth the student's while to ascertain what are the proportions of celebrated buildings, as well as the size of their mouldings, with reference to the building itself.

Now, in the case before us, taking the distance between the centres of the columns as the width of the nave, or the elementary scale, we find that the height of the apex of the vaulting from the pavement of the church is as nearly as possible three equilateral triangles placed one above another, the base of all being the width of the nave. The triforium string-course is one half this total height, or a triangle and a half.

In the Chapter-house, measuring from the centre of the central shaft to any of its angles for the elementary measure, and inscribing thereon an equilateral triangle, it will be found that the bosses of the vaultings are just the height of two of these figures from the pavement; or the proportion of a regular *vesica piscis*.

You will not allow the discordant colouring of the glass in the windows at the ends of the transepts to prevent your noticing the architecture there. The lines of the general design are here continued, but diversity is likewise secured, and a truly admirable effect produced. Neither of the rose-windows is original. That in the south transept was renewed in the fifteenth century, and again in the seventeenth, about forty years, as Sir Christopher Wren informs us, before the date of his report. In general design, however, there are good reasons for supposing that the original form has been pretty closely adhered to. It appears there was found on the Chapter-house floor (I cannot find it now) the pattern of a wheel-window on four tiles of thirteenth-century work, which bears a most striking resemblance in all its intricate subdivided tracery to the rose-window in question. This is strong corroborative evidence.

The north window, however, is of the eighteenth century, and cannot much resemble its predecessor. There is fine figure sculpture, representing angels censing, in the triforium at the ends of the transepts, and on the window jambs below, the latter now much effaced, and, in some cases, hardly to be discovered in the gloom which the heavily-coloured opaque glass throws over this part of the church.

I have hitherto chiefly spoken of the work of Henry III., supplanting the older edifice of the Confessor built two centuries before. Henry's work terminated in 1269, just west of the crossing. I suppose that the eleventh-century nave existed up to this time. Edward I. continued the rebuilding of the nave for the next five bays. You will see certain diversities of treatment in details, but the design, on the whole, remains the same. The columns have four attached and four detached Purbeck shafts, instead of merely four detached Purbeck shafts round a central cylinder in Henry's work. The Edwardian vaulting ribs are more complex and of different section, not to be compared, in my opinion, with the severe beauty of the earlier work; the capitals of the wall arcade are moulded, of Purbeck, not carved, and shields have been introduced into the foliage which adorns the spandrels. The modern monuments have, however, left but little of these original beauties of the abbey for your study in the nave. Those shields which remain carry the arms of the great men of the day.

The capitals of the window shafts are likewise simply moulded, instead of being carved, in Edward I. work. The bosses of the vaulting ribs, on the other hand, in his time were exceedingly elaborate and beautiful.

Still going west we come to the work of Richard II., or rather of the abbots in his reign. There you will see in the aisle windows the cinquefoil filling to the upper circle gives place to the somewhat gaping quatrefoil before mentioned; the window-shafts have octagonal instead of circular abaci, and other slight changes may be discovered by the attentive observer, though the general design remains the same.*

ARCHITECTURAL ASSOCIATION.

THIS Association last Saturday visited the new St. Paul's School, West Kensington, over which they were conducted by Mr. Waterhouse, A.R.A., the architect of the building. This was the second visit paid to the School by the Association, as they previously inspected them in 1883, when in progress. The buildings have now been completed by Messrs. Parnell & Son, of Rugby, the contractors. Mr. Leeds is the ventilating engineer for the structure, and explained to the party the arrangements for heating and ventilation. The schools were illustrated in the *Builder* of August 26th, 1882. The school was founded by Dean Colet, in 1512, and twice rebuilt on the original site in St. Paul's Churchyard. Among its former scholars are included the names of Milton, Leland, Halley (of the Comet), Strype, Pepys, and the first Duke of Marlborough.

Mr. H. D. Appleton then proceeded with the members to inspect four houses in course of erection on the Collingham Gardens Estate, South Kensington, from designs by Messrs. Ernest George & Peto, architects, the contractors being Messrs. Peto Bros., builders. The members were received by Mr. W. Jacobs, foreman to Messrs. Peto, who explained the plans and details.

Mr. Edward W. Wyon died last week at the age of 74 years. He was the youngest son of Thomas Wyon, the Chief Engraver of Seals to George III. and George IV. His early life was chiefly devoted to gem modelling, and he assisted in many of the important works of his brother Benjamin, who succeeded their father as Seal-Engraver-in-Chief. In later years he produced his larger works, notably Britomarte for the Egyptian Hall of the Mansion House, Edward III. and Queen Philippa in the Drapers' Hall, and many other statues. The lunettes in bas-relief in the dome of the National Gallery are from his hands.

* The remainder of the lecture, together with some additional illustrations, in our next.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

MEDALS AND PRIZES, 1885.

AT a special meeting of members, held on Monday evening last, Mr. Ewan Christian, President, in the chair, the awards of medals and prizes were considered.

The Royal Gold Medal, 1885.—The following resolution, moved by the President, was carried by acclamation, namely, "That, subject to her Majesty's gracious sanction, the Royal Gold Medal for the year 1885 be presented to Henry Schliemann, F.S.A., Hon. Corr. Member (Athens), Hon. D.C.L. (Oxon), &c."

The adjudication of medals and other prizes was then proceeded with.

The Tite Prize (value 30*l.*).—Subject, a grand pavilion in a fashionable watering-place (seven competitors). Medal awarded to the author of the design bearing the motto "Spes dulce malum," who was found to be Mr. John Archibald Campbell, of 16, Woodside-crescent, Glasgow.

The Grissell Gold Medal.—Subject in Iron Construction, Central Hall of a Fruit and Vegetable Market.—The Secretary announced that no design had been submitted for this medal.

The Soane Medallion and 50*l.*—Subject, a Municipal Mansion (thirteen competitors).—The recommendations of the Council respecting the award of the Soane Medallion and (subject to the usual conditions) 50*l.* were that the medal, &c., be awarded to the author of the design bearing the motto "Here we are again!" (Mr. Arnold Bidlake Mitchell, of 36, Pembury-road, Clapton); a Medal of Merit to the author of the design bearing the motto "Acanthus" (Mr. Alfred A. Cox, of 16, St. George's-terrace, Queen's Gate, S.W.); and a Medal of Merit to the author of the design bearing the motto "Forward" (Mr. John Thompson, of 3, Selwood Terrace, Onslow-gardens, S.W.).

The Institute Medal and Ten Guineas (*Measured Drawings*).—Six competitors. Upon the recommendation of the Council, it was resolved that the Institute Medal and ten guineas be awarded to the author of the drawings bearing the motto "Forward," for his drawings of the Church of Ottery St. Mary, Devon. The name and address of the successful candidate were found to be Mr. Ernest A. Coxhead, Montrose-villa, Grove-road, Eastbourne. It was also resolved that a Medal of Merit and ten guineas be awarded to the author of the drawings bearing the motto "Septentrionale," for his drawings of King's College, Aberdeen. The author was found to be Mr. James Cromar Watt, of 71, Dee-street, Aberdeen. It was resolved that a Medal of Merit be awarded to the author of the drawings bearing the motto "Hope," for his drawings of Woodsome Hall, near Huddersfield. The author was found to be Mr. John Holmes Greaves, of 15, Park-row, Leeds. And that a Medal of Merit be awarded to the author of the drawings bearing the motto "Ars," for his drawings of All Saints Church, Walsoken, Norfolk. The author was found to be Mr. A. G. Adams, of 1, Elyplace-crescent, Wisbeach. It was further resolved that a Certificate of Honour be awarded to the author of the drawings bearing the motto "Perseverando," for his drawings of Wenlock Priory, Shropshire. The author was found to be Mr. Thomas Locke Worthington, 25, Brasenose-street, Manchester.

The Institute Medal and Ten Guineas: Essays. Subject, Pediments and Gables. (One competitor).—On the recommendation of the Council it was resolved not to award this prize.

The President then stated that the Council had that day given consideration to a wish formulated by the Medals and Prizes Committee that the sum of money, namely, ten guineas, which accompanied the Institute Medal for essays, should be largely increased in amount; and the Council recommended that for the said prize next year the sum of twenty-five guineas should be offered as well as the medal. After a somewhat long discussion, the matters touched upon therein by the President and the other speakers were left to the Council to consider and settle.

Subjects for Medals and other Prizes, 1885-86.—The recommendations of the Council, in the matter of the subjects for medals and other prizes to be competed for during the session of 1885-86 were then discussed, and the Council were requested by the meeting to take note of the various opinions expressed by members upon the character of the subjects recommended for adoption, and to consider and settle the same.

The proceedings being then at an end, the meeting adjourned.

ON GREEK ARCHITECTURE.*

I HAVE chosen a very ambitious title for this lecture, but it seemed best to make the title as comprehensive as possible, because it is obviously impossible in one evening to do more than take a general view. I will now endeavour to point out the heads which I propose to work out more fully, viz., firstly, to consider why it is so important to study this style; and then to glance very rapidly at the sources from which it was derived, and the phases it went through.

Then to refer to the characteristics of the different orders in succession, and to mention some of the principal monuments in each period.

Afterwards to endeavour to find the secret to which we owe the beauties which are recognised by all intelligent critics, whether by careful adjustment of light and shade, or by proportion, or by more delicate optical refinements than have anywhere else been practised.

Greek architecture has had so many admirers that it might seem almost needless to bring forward reasons why it should be studied; but there are also, undoubtedly, persons who have occupied high places in literature and in the arts who have spoken slightingly of it, and the term Grecian has been often used opprobiously by the too exclusive followers of the Gothic. I do not for a moment contend that Classical interpolations in Gothic works, where they have no business to be, may not have given reason for opposition to particular cases of intrusion; but we must all have heard or read of general denunciation of Greek architecture, which can only prove in their authors inability to see more than one side, or rather only part of a side, of the palace of art.

It is true that we have made many unsatisfactory attempts to introduce Greek architecture into our ecclesiastical and domestic works. I do not admit that they are all entire failures, but no doubt there are a great many. But this is almost a necessary result of merely copying the features of a by-gone style, adapted to conditions different to our own.

But the Classical copyist has no monopoly of failure. Many of our experiments in Mediæval architecture have been equally misapplied.

Our proper object in studying ancient architecture should not be for the purpose of collecting "bits that will come in well," but that we should imbibe the principles of so great and noble a style as that of Greece; and as in whatever style we work we must use certain details by way of expression, it is important that we should well understand the aim and success of those of Greek architecture, which was the base and root of all modern work whether Classical or Gothic. The analogy of language is just to the point. Who would say that because Greek is to some extent a dead language, it is of no consequence that our scholars should study it? There is not only a great reward for those who can read Homer and Thucydides in their own language, but the person who is familiar with such authors will express himself better in his own than if he had been ignorant of them. In the same way in architecture, merely to understand such a building as the Parthenon is a great pleasure and advantage, but to be imbued with its spirit and art principles cannot fail to have a useful effect upon a designer. But your presence here shows me that it is not necessary to occupy any more of your time with an apology.

Firstly, let me acknowledge, with thanks, the loan of many of the diagrams on the wall. For some of them I am indebted to Professor Donaldson; for others, to the collection left to the Royal Academy by Professor Cockerell; and for those illustrating the Erechtheum and the general views of Athens, to Mr. Fergusson.

In seeking for the derivation of Greek architecture, we must at once notice the two main branches, the Doric and the Ionic. In point of absolute date, the Ionic seems to have first occupied the ground, although we have no temple architecture to which so great an antiquity can be assigned as to some of the Doric structures. A leading tribe of the Pelasgic family, and in immediate relationship with the Homeric families of Argos, occupied Ionia, in Asia Minor. These Greeks, whether in Asia or Europe, must have had much connexion with the Phœnicians,—a people so celebrated for its art development, that Solomon, when building his temple, sought for their assistance. Cadmus, one of the least uncertain of the mythological heroes, was of Phœnician extraction, and the legend of Europa, daughter of a king of Tyre, points in the same direction. One of the most characteristic ornaments at Mycenæ was the scrollwork pattern which is frequently found in Asiatic work. The pattern exhibited is an enlargement from a piece of pottery discovered by Dr. Schliemann near the tomb of Agamemnon. The Ionic capital preserved, in the full developed architecture, this type.

The oldest temple at Athens, of which we have any traces, was no doubt the Erechtheum,—not the temple which we now see, but its predecessor,—and we may be quite sure that its original Ionic architecture was purposely continued in the newer structure. In the time of Homer this Pelasgic or Ionian family were dominant; but shortly afterwards a great revolution occurred in Greece from the invasion of the Dorians, a race bearing somewhat the same relation to the Pelasgi that in our own country the Normans bore to the Saxons. These became the rulers of the country, and especially of the Peloponnesus, and introduced the Doric architecture, which seems to have been partly based on Egyptian prototypes. A branch of the Dorians had sojourned in Crete, as mentioned by Homer, and so would be favourably situated for correspondence with Egypt; indeed, it can hardly be doubted that the Doric column had its origin on the banks of the Nile, and was there executed in stone, but the Dorians combined it with a superstructure which had its motive in wooden construction. We know nothing of the first attempts in this combination. All the early experiments have perished, and we find the union complete, full grown, though not yet fully educated in the massive temples of Corinth, Ægina, Selinus, and Pæstum. The Dorians threw out colonies to Sicily and the south of Italy called Magna Græcia, and the earlier temples in those countries are almost invariably Doric. There is an Early Doric temple at Assos, in the south of Phrygia, and a Late Doric temple at Delos; but these architectural inroads into the Ionic countries are rare.

The Ionians still held their ground in Asia and in most of the islands of the Ægean Sea, and were, on the whole, in the ascendant at Athens, or, at least, the two races were blended on fairly equal terms, and there, at any rate, we find the most happy combination of the massive and simple Doric and the more elegant Ionic. The Doric is more refined and the Ionic more forcible than elsewhere. There was also one important Ionic temple in the Peloponnesus, namely, Tegea, but of it nothing is now extant, or, at any rate, known.

A third order, as we all know, was developed, namely, the Corinthian,—so called, I suppose, from its rich and ornate character and so suited to the luxurious Corinthians. Vitruvius, indeed, tells us it was first used in the neighbourhood of Corinth; but, as by the same authority, it was invented by Callimachus, an Athenian architect, and the oldest examples extant seem to be the single column in the interior of the temple at Bassæ, the work of an Athenian architect, and after that the exquisite choragic monument of Lysicrates at Athens, we may fairly doubt the priority of Corinth in its use. It is as true of this order as of the Greek poetry that,—

> "Græcorum sunt antiquissima quæque
> Scripta vel optima."

All subsequent examples are inferior to these earliest, so that the Corinthian did not go through the same process of refinement and perfection as the other two orders; but that, no doubt, was owing to the political and artistic decadence of Greece, for this order, was, as it were, the child of the old age of Greece, and its education ere long had to be entrusted to a stepmother. The Corinthian order was used by the Romans almost to the exclusion of the others, and through them had an immense effect in producing the Mediæval styles. Many of the features of Romanesque architecture in France and Italy are scarcely distinguishable from late Classical work, and these merged into the Gothic by steps easily traceable.

* A lecture by Mr. F. C. Penrose, M.A., delivered to the students of the Royal Academy on the 27th ult.

The phases which the architecture of Greece went through were exactly such as come by natural growth, but of which at the present day we can have no experience in consequence of our having no true or living style. Exactly as the massive Norman produced the refined, but still forcible, Early Gothic, then the rich Decorated and towering Early Perpendicular, and, lastly, the attenuated Tudor or Flamboyant; so in Greek architecture the severe and simple features of the temple at Corinth were educated into the perfection of the Parthenon and Propylæa, and then became drawn up and enfeebled as in the later examples. When it had reached this state the salt had lost its savour, and it was very properly supplanted by the Corinthian.

In the diagram I have represented the relative proportion of the entablature to the column in several examples. The scales are so adjusted as to make the column of the same height in each, so that the relative heights of the entablatures show their comparative massiveness.

Judging from the architrave, which alone remains, the temple at Corinth has the most ponderous entablature. Then follows the earlier Parthenon, of which part of the entablature and some drums of the columns remain built into the north wall of the Acropolis of Athens. It is true that the height of the column is conjectured, but judging from the character of what remains, and from the known diameter of the column, it seems proper to put it intermediate between the Corinthian and the Æginetan example which is next to it. After the latter,—taken from the Temple of Jupiter Panhellenius at Ægina,—follows the Theseium. The Parthenon is slightly less massive than the Theseium, but it wants nothing in appearance of solidity. The three later examples are inferior in dignity; but it should be mentioned that the example from Nemea is from a temple which is carefully worked in every respect, and is of a good period, and it is not unlikely that the lightness of the entablature may have been designed expressly on account of its situation in a valley, where a primary consideration would be the total height of the temple, as obtained by an unusual height given to the columns. Both the portico of Philip at Delos and the gate of the New Agora at Athens were civil, not religious, structures, and their lightness may partly be accounted for on that ground; for we learn from Vitruvius that this was one of the principles acknowledged:—"Aliam enim in Deorum templis debent habere gravitatem aliam in porticibus et ceteris operibus subtilitatem." The approximate dates of the buildings I have mentioned are:—

Corinth	B.C.	650
Earlier Parthenon	,,	600
Ægina	,,	550
Theseium	,,	467
Parthenon	,,	440
Nemea	,,	400
Delos	,,	350
New Agora, Athens	,,	40

There were also important Doric structures at Eleusis and Olympia, but we may omit their consideration in this general *résumé*, because they were of a less refined character than most of the works mentioned above, and their proportions cannot be satisfactorily quoted, as the height of the column would be to some extent conjectural. Many of the remains in Sicily are both large and well preserved, but all are comparatively coarse unless it be the fine temple at Segeste, and in Italy there is the noble Temple of Neptune at Pæstum, but I am not aware that either of these has been examined with the scrupulous care that is necessary to establish the relations of accurate proportion.

The Ionic architecture followed no doubt a strictly analogous career, but from various reasons,—especially that of the Persian wars,—we have not any specimen of nearly so early a date as we have of the Doric. Subsequently to the invasion of the Dorians, as already mentioned, this architecture had never been in favour in the Peloponnesus. Its chief expansion was in Asia Minor and in Attica, but all this country was overrun by the Persians, who made a point of destroying the temples.

The oldest specimen known to us in Greece seems to have been the small Temple of Triptolemus on the Ilissus at Athens, which, unfortunately, does not now exist, but was carefully measured and drawn by Stuart. This may, with great probability, be assigned to one of the years immediately following the battle of Salamis, or about B.C. 478. The proportions of the entablature to the column in this temple contrast very remarkably with those of the Erechtheum, and still more so with the examples for the most part in Ionia. In this temple the diminution of the column is also small, being about one-ninth of the lower diameter instead of something between one-seventh and one-eighth, and its height is only eight and half diameters instead of nine and a half in the case of the Erechtheum, and ten in some of the best of the Ionian specimens. There are not, however, examples enough extant to illustrate sufficiently the gradual development of the Ionic, for the conditions most favourable to this style of building had only a short duration, namely, from about 450 B.C., when the peace with the Persians resulting from the victories of Cimon, the son of Miltiades, secured the practical freedom of the Asiatic Greeks until the wars of Alexander and his successors, which commenced about 340 B.C. When Ionia was again brought under a stable government by the Romans, the Corinthian had become the dominant style. The oldest of the Ionian temples is at Samos, which seems to be of a very early type, and probably is anterior to the subjugation of the country by the Persians, and therefore may be about 500 B.C., but the remains are too scanty to afford sufficient data for criticism. The other principal works are the Temple of Diana at Ephesus, that of Didyme or Branchidæ, Sardis, the extremely elegant but smaller temple of Minerva at Priene, and the Mausoleum at Halicarnassus. The principal remains of Greek architecture are the temples, and a circumstance which has preserved many of them to us is that they were, after the decay of Paganism, many of them converted into churches. There are also theatres and stadii, and occasionally tombs. The traces of domestic architecture, however, are very scanty. This remark, indeed, does not apply to the later and provincial towns of Pompeii and Herculaneum, which have been handed down to us by Vesuvius. But there is no doubt that in the best days of Greece the temples occupied a somewhat similar position as did our ecclesiastical architecture in the Middle Ages. The domestic structures were not prominent,—

> "Nulla decempedis
> Metata privatis opacam
> Porticus accipiebat Arcton."*

The palaces of kings were, perhaps, sometimes exceptions, as the recent explorations of Dr. Schliemann at Tiryns seem to show; but they were also citadels. Still the temples were pre-eminent; very great care was taken in the choice of their sites. Vitruvius, who has preserved some of the traditions of the ancients in a curious conglomerate, at the end of his first book, directs that the temples of Jupiter, Juno, and Minerva should be placed in the highest ground in a city. As remarkable instances of this may be cited pre-eminently Athens,—the Temple of Jupiter Panhellenius at Ægina, Segeste and Agrigentum in Sicily, and Sunium; but all, or nearly all, are well placed, and doubtless the situation was carefully considered in the design, and exerted great influence upon it.

It is a great error to suppose, as some have imagined, that all the Greek temples are built upon one model, and, given the number of the columns and their diameter, it would be possible to restore the design of a temple without knowing anything more about it, except, perhaps, the order. On the contrary, we find in each temple variations both of distribution and detail, which entirely disposes of so limited a conception of the duty of a Greek architect.

Let us, however, leave generalities, and examine some examples more particularly; and as fortunately the same city which in the judgment of antiquity received the highest praise for the magnificence of its architecture still retains for us the best-preserved models, we shall do well to confine our attention for this evening to the city of Minerva.

The Acropolis is a detached rock with a fairly flat summit, having a general extension from east to west, very precipitous towards the north, east, and south, but sloping more gradually towards the west, where the ridge again rises, but to a less elevation, in the Areopagus. Athough in ancient times, when Athens had its greatest development, the Acropolis was surrounded with buildings on all sides, yet the most populous part was to the north, where also the modern town is situated. The rock rises about 300 ft. above the general level of the town. A little way off, on the south side, is a range of hills which on one point rises almost to the level of the Acropolis, namely, the ancient Museum, which is crowned by the monument of Philopappus, a work of Roman times. There is a tolerably deep valley between this hill and the Acropolis, and against it were built many important structures, especially the great Theatre of Bacchus, capable of containing 30,000 spectators; and various temples, of which many traces have been recovered by recent excavations, notably the Temple of Esculapius, with the fountain described by Pausanias. Its architecture was Doric, but not of the very best period. There is also the Odeum, built by Herodes Atticus in later times.

Beyond the Areopagus, and towards the bottom of the slope, on a spur trending away to the north, still having sufficient elevation to offer a splendid site, and standing well above the plain is the exquisite Doric temple of Theseus, of which we do not absolutely know the origin, but Leake is probably right in considering it was built during the pre-eminence of Cimon, the son of Miltiades. Not far off is the gate in the city wall, called Dipylum, and the commencement of the sacred way leading to Eleusis, lined with tombs, many of them of remarkable sculpture. From this point, turning eastwards, we come to a four-column Doric portico, the gate of the New Agora, built about forty years B.C. Its architectural character has already been referred to. Near it is another building of municipal character, and not much earlier in date, the Horologium of Andronicus Cyrrhestes, commonly called the Tower of the Winds. It formerly contained a water-clock, and still retains the hour lines of a sun-dial. There is much architectural elegance and simplicity about it, but the sculptures which are carved in relief on the eight faces of the octagon are very rude and inartistic, and show an extraordinary decline from the days of Pheidias. Northward of the Horologium is a work of Roman times, the Stoa of Hadrian, of considerable extent and magnificence of material, but the profiles of the mouldings and the carving of its Corinthian capitals are very inferior. Under the east end of the Acropolis rock is the exquisite little temple or choragic monument of Lysicrates, which used to be called the Lantern of Demosthenes. The illustrations on the wall will give some idea of its extreme refinement (notice the moulding of its base). The date of this earliest known example of the Corinthian order, except the one column of the Temple of Bassæ, is 334 B.C., the same year in which Alexander invaded Persia.

We may pass through the arch of Hadrian,—a work which, at least at Athens, does not invite much observation,—to the very fine remains of the enormous temple of Jupiter Olympius. This temple, though contemplated by Pisistratus, does not seem to have been proceeded with until the time of the successors of Alexander. Antiochus Epiphanes, between the years B.C. 174 and 164, made great progress with the work, having employed a Roman citizen as architect, named Cossutius. It is, no doubt, this design in the main which we see, but the work was discontinued after his death and resumed under the influence of Augustus, again to be postponed and finally finished and dedicated by Hadrian. The columns are of fine work, and though much less graceful than those of the monument of Lysicrates, are altogether of a superior character to the neighbouring arch of Hadrian or the Stoa mentioned above. It would therefore seem that although there can be no doubt that Hadrian finished and dedicated the temple, the design was of a much better period. Only fifteen columns remain standing out of the original number of 116 which formed the porticos and peristyles, and these were only preserved to us by the fact that a small church was built in amongst the columns of the south-eastern angle of the temple. Still, their great height,—about 56 ft.,—gives to these fifteen columns a most impressive effect. The temple was surrounded by an ample peribolus, which was formerly full of statues.

Near the temple of Jupiter Olympius, and on the other side of the Ilissus, was the small temple of Triptolemus, which has already been mentioned.

Having thus completed the round of the existing remains outside the Acropolis, we may ascend by its only access, the Propylæa towards the west, and here was, in the opinion of the

* "The loggias, built to invite the cool north wind, were small, and needed not to be measured by the ten-foot rod."

ancients, and which seems thoroughly justified by the existing remains, the finest monument in Athens. A grand flight of marble steps, about seventy in number and 70 ft. wide, led up to a portico of six Doric columns, more than 5 ft. in diameter, contrasted by two smaller Doric porticos on either side. On the right hand of approach was a small but exquisite Ionic temple; Victory without wings,—for the Athenians fancied they could secure continued victory by making the goddess wingless,—and on the left a large pedestal supporting a group of statues. Both these smaller and subordinate structures were out of parallel to the Propylæa, and so caught the sun's rays at a different angle, giving great beauty and variety to the scene, and as they were independent of the main design they did not in the least disturb its continuity. The main central portico was divided into three aisles by two ranges of Ionic columns. The ceiling was entirely of marble, and supported by marble beams, more than 20 ft. in length. Having passed through the propylæa the spectator emerged close under the pedestal of the gigantic statue of Minerva Promachus, and passing up a street full of sculptured memorials, and rising rather rapidly all the way, soon came in front of the Parthenon. The access was not in the central axis of the temple, but giving an oblique view, which was far more interesting and picturesque. The combination of symmetry and freedom in Greek architecture is one of its most important characteristics, and most deserving our attention.

No doubt the architecture of the Parthenon was enriched with the grandest accompaniment of sculpture that the world ever saw. We have fortunately sufficient remains of the work of Pheidias from the east front to establish this, but it would be quite a mistake to consider the architecture merely as a frame for the sculpture. It has its own qualities, its harmonies of proportion, and its contrasts of light and shade. I shall refer later to the exact proportions which rule in the principal masses; but it is desirable to remark that in smaller features, such as the metopes, there is a remarkable inequality of width, those in the centre of the front are, on the whole, the widest, but in no regular gradation. There is thus a law of liberty, quite consonant with the works of nature, introduced, which enlivens the general effect. A modern builder would be shocked if he were told to make some of the metopes 4 in. wider than others.*

The temple, technically described, is peripteral and octastyle, with pronaos at the east and posticum at the west, each having its own portico of six columns. The interior was divided into two parts, the cella embracing both these parts; and to the east was the naos, or temple proper, containing the colossal gold and ivory statue of Minerva; and to the west was the opisthodomus, which was used as the Public Treasury. Both the naos and the opisthodomus were closed with wide and lofty folding-doors, and there was a communication by means of two small doors between the opisthodomus and the naos. The naos was divided into three aisles by two ranges of columns one over the other, as we see still standing at Pæstum and Ægina. The traces on the pavement show that the lower columns were Doric, and the upper columns were probably Doric also. The opisthodomus was supported by four columns. The slabs on which they stood still remain, but there are no traces of the columns. It is, however, presumable that they were of the Ionic order.

In addition to the Parthenon there were several temples and some municipal buildings on the Acropolis; but little remains of these. Nor do the accounts of Pausanias and other ancient writers lead us to suppose there was any great interest in any of them, excepting the Erechtheum, which is, perhaps, both on account of the beauty of its architecture and the interesting intricacy of its plan, the most valuable relic of antiquity. After the Propylæa and the Parthenon it certainly is so. In the Middle Ages it was converted into a church. It afterwards became the Turkish pasha's residence, and, finally, a storehouse, and partly a gunpowder magazine. It has suffered very much, but still enough has been preserved to indicate the beauty of the original, and to be the groundwork of volumes of archæological discussion. It was a double structure. The temple of the goddess Athena Polias, the original Minerva tutelary of Athens, and the fane of the hero Erechtheus, and also combined with it was a compartment sacred to the nymph Pandrosus. The temple (speaking of it as a whole) preserved evidence of the contest of Neptune and Minerva for the protectorate of Attica. The mark attributed to Neptune's trident on the rock was there,—and, indeed, it may still be seen,—and the sacred olive which Minerva produced, and which decided the contest, was preserved in some part of the sanctuary.

It is a curious point in the archæological discussion having reference to the distribution of the area of the temple that the behaviour of a certain dog throws more light upon it than even the narrative of the traveller Pausanias. The story is told by one Philochorus, who had no doubt been scandalised by the desecration of the sacred spot.

"A dog having entered into the Temple of Minerva Polias rushed down into the Pandroseum, and, having mounted upon the altar of Jupiter Herceius, which is under the olive tree, lay down." Now, consider the temple itself divided into two parts (for the levels differ by many feet), the eastern and upper part sacred to the hero Erechtheus; the larger and western part, which is approached by the four-column portico of the noblest proportion, to be the Temple of Minerva Polias; and the Pandroseum, to be the space immediately to the west of the temple, we can see at once the manner in which the dog behaved, not having the fear either of Minerva or Jupiter before her eyes. There are still evidences of steps leading down through a doorway in the western wall, and there are evidences of an enclosure of the space westwards of the temple. Here would then be the olive tree and the altar of Jupiter, and the garden and residence of the virgins who attended to the worship of the nymph Pandrosus. This space is bounded on the south by a rather lofty and very rough wall, which seems never to have been cased with finer work, but was probably concealed by the shrubs or creepers of the garden, and very probably helped to support the open work beams of a trellis or *pergola*. There seem to be traces of some such construction against the west walls of the Erechtheum. The staircase shown in Inwood's plate is quite imaginary.

It should be borne in mind that the Minerva of this temple was more reverently worshipped than the Minerva of the Parthenon. In the great Panathenaic festival every year, and with more extraordinary pomp every fourth year, there was a procession to this statue, and as the new temple which we see, was necessarily limited in size by the original sacred site, it was of the more importance to embellish it with ornament, and this has certainly been done in the most appropriate way. We do not know whether there was any sculpture in the pediments,—it may reasonably be concluded there was not,—but the frieze still shows the attachments of figures. The band of ornament which carries round the line of the capitals,—themselves the perfection of all Ionic work,—is extremely graceful and tender, and the bases were beautifully carved. But there was also plenty of solid and plain masonry, some of the stones being very massive. However the problem arose, how to give sufficient importance to the south front facing the Parthenon. This was solved by the, perhaps original, conception of the Caryatid portico. The plan of the Erechtheum did not admit of a public entrance at this point,—a small private door for the use of the privileged is there. It is, therefore, rather a loggia than a porch. The pose of the figures themselves is most remarkable, and they appear quite sufficient for the work they have to do. They differ enough amongst themselves to have individuality, whilst the idea given at first sight is that of exact resemblance, excepting that they are contrasted in the pose of the legs upon which they chiefly bear their weight. The folds of the drapery falling with a general appearance of verticality towards the outsides of the portico have a columnar effect. All this has been well stated by your President in some remarks on a paper by Mr. Fergusson on the Erechtheum in 1876, which will be found in the "Transactions" of the Royal Institute of British Architects for that year.*

* Probably this arose from variations in the sculptor's treatment of the metope subjects.—ED.

* We will give the remainder in our next, accompanied by reproductions of a few of Mr. Penrose's diagrams.

Illustrations.

WESTMINSTER ABBEY.

IN connexion with Mr. Waterhouse's lecture at the Royal Academy this week, reported in another column, we publish a series of measured drawings of various portions of the abbey. The reproduction of Hollar's view of the abbey from the north is a fair example of the English architectural engraving of the period, and corresponds fairly with Newcourt's plan, which frequently accompanies it. It was engraved in 1654, only two years after Hollar's return to England. The central lantern was not then erected; on the other hand, the porch of the north transept is still shown. It was removed when the transept was restored, in the early part of the last century.

The other illustrations include one bay of the choir, section and elevation, measured and drawn by Mr. E. Emlyn White; the interior face of the south transept, measured and drawn by Mr. J. Atwood Slater, to whose careful and beautiful work we call the more attention as he has not signed his drawing, as the other contributors have. Both these drawings obtained for their owners the Royal Academy Silver Medal. Mr. H. O. Cresswell contributes a drawing of the screen of the tomb of Henry VII., which obtained a Medal of Merit in the last competition for the Pugin Travelling Studentship; Mr. Maclaren contributes drawings of the cloisters, which obtained similar recognition on the same occasion; and Mr. Shearman contributes an elevation of the Chapter-house doorway.

The building is fully dealt with in Mr. Waterhouse's lecture. It only remains for us to express our best thanks to those who have so kindly lent us their drawings, and our appreciation of their merit as specimens of architectural draughtsmanship.

CENTRAL ASSOCIATION OF MASTER BUILDERS.

THE annual general meeting of the Central Association of Master Builders of London was held at 27, King-street, Covent-garden, on the 25th ult., Mr. F. J. Dove in the chair.

The Secretary read the balance-sheet as audited and signed, and copies were handed round for inspection. It was resolved "That the balance-sheet as audited and read be adopted."

The Secretary next read the report, and the Chairman having addressed the meeting upon the several matters referred to therein, moved that the report as read be adopted.

The motion, having been seconded, was carried unanimously.

The Secretary reported that the balloting list had been prepared in accordance with Rules XV. and XVI., and it was resolved:—

"That the officers and committee, as printed on the balloting-list forwarded to members, be elected for the ensuing year."

The newly-elected members having taken office, the Chairman, referring to the rate of wages in the London district, mentioned that he had been invited and had attended the meetings of the Industrial Remuneration Conference, but had refrained from speaking, as he did not feel justified in committing his colleagues to any opinions without their having been consulted, but he could not help saying to those present that he was surprised at the earnestness and intelligence shown by several of the working-men delegates, and he had come to the conclusion that this Association would do more by meeting the representatives of the men than it would by opposing the action of the trade unions in Parliament. After some discussion of the subject, in which several members took part, it was resolved,—

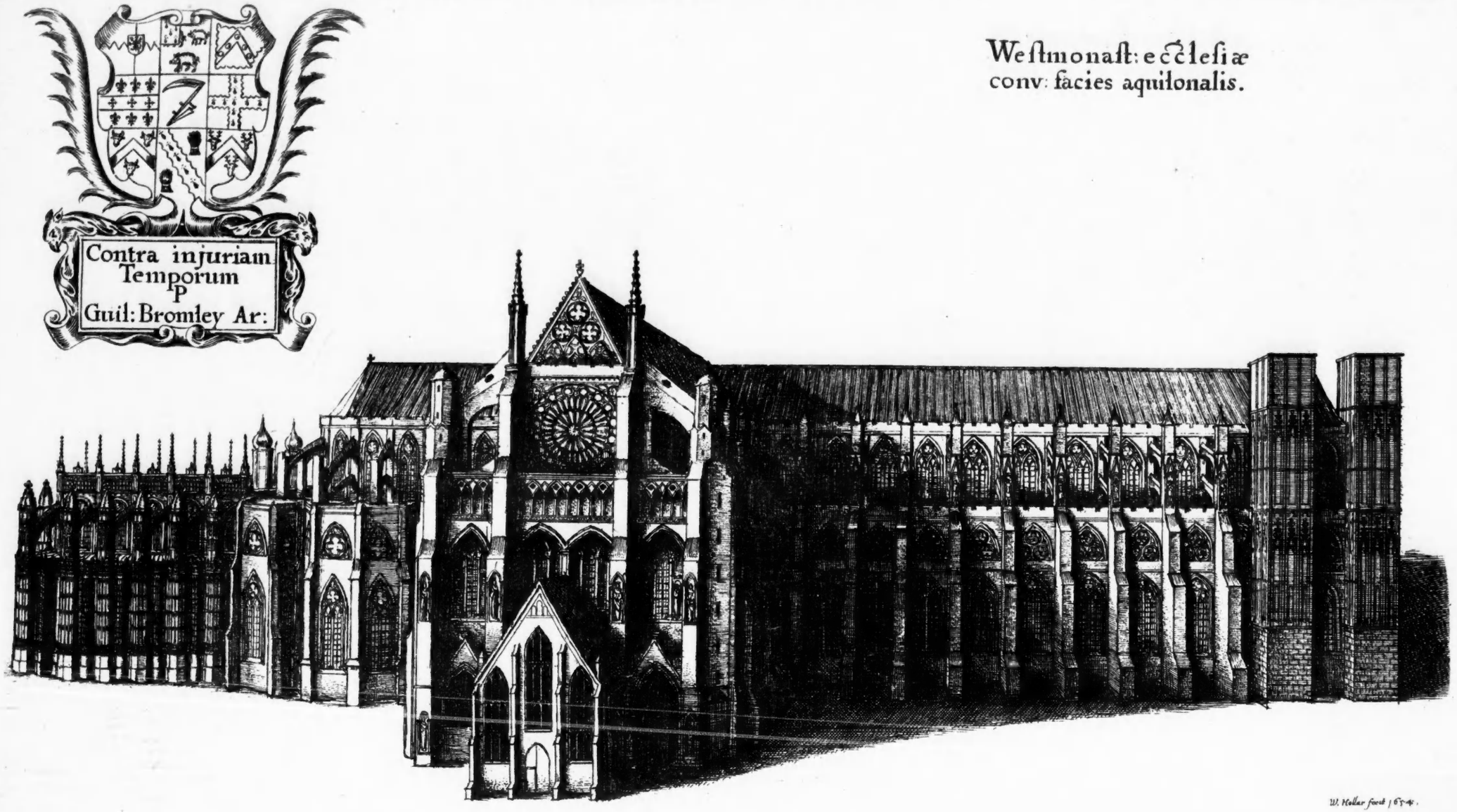
"That if the workmen have any just grievance to complain of the Committee are hereby empowered to meet them without any further authority."

A letter to the *Builder* of February 14th, 1885, signed "H. S.," having been read, and the subject* spoken to by some of those present, it was resolved,—

"That the attention of the Committee be called to the desirability of writing the First Commissioner of Works and Public Buildings requesting that, in accordance with the almost universal practice of architects, when tenders for building works have been received and a decision arrived at, the parties tendering be permitted to see a list of the same."

The meeting was concluded by a vote of thanks to the chairman.

* "Government tenders."



Wyman & Sons, Photo-Litho

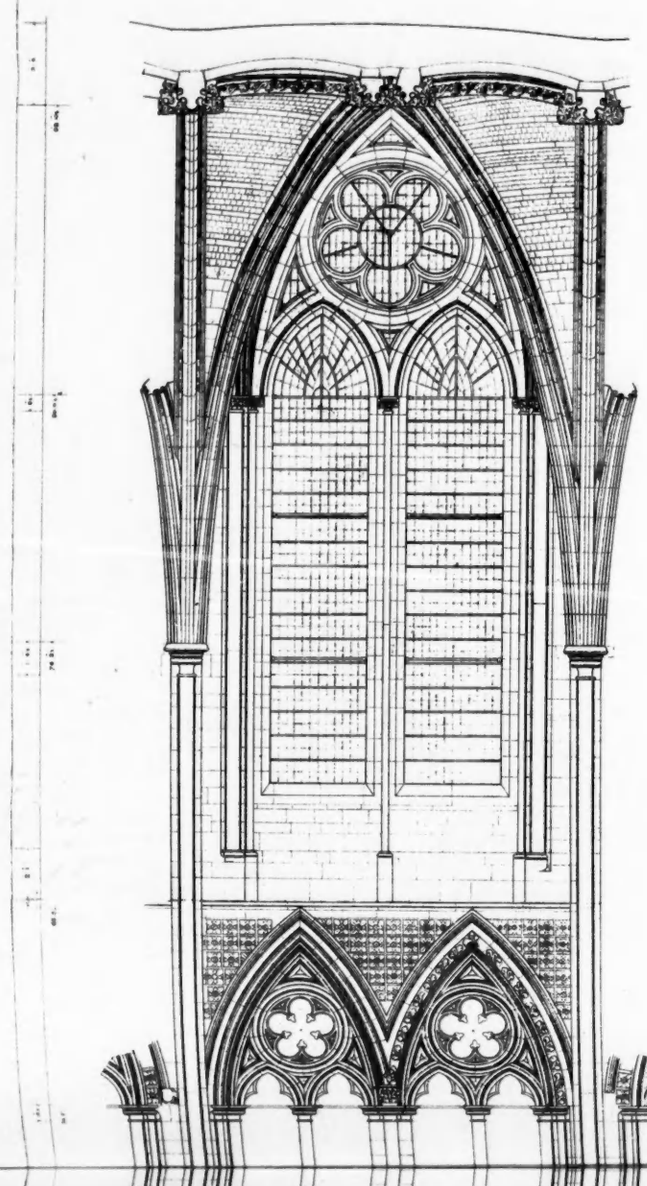
C^t Queen S^t London, W.C

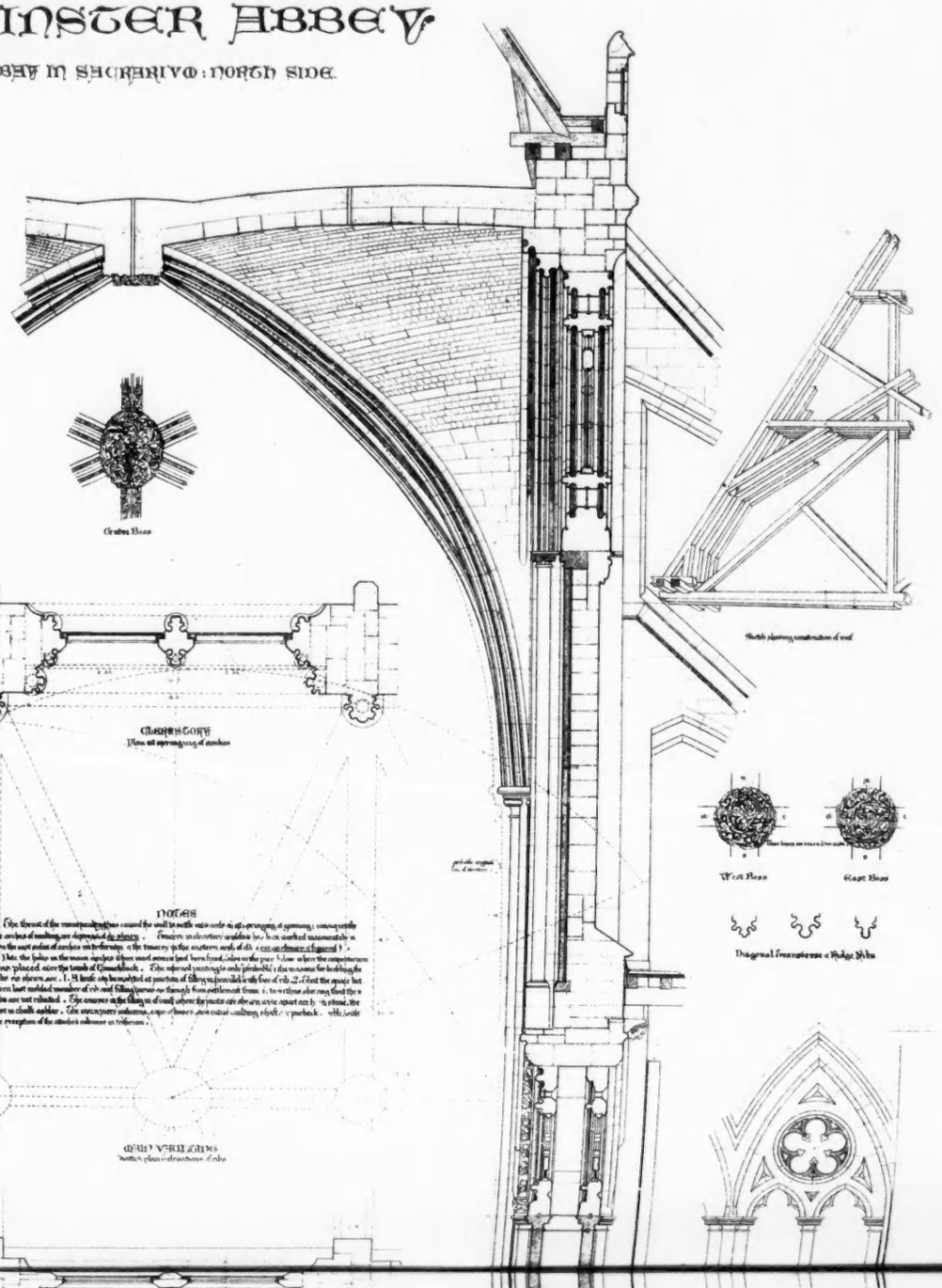
WESTMINSTER ABBEY IN THE SEVENTEENTH CENTURY.——FROM A PRINT BY HOLLAR.

See A on General Plan.

WESTMINSTER ABBEY.

SECOND BAY IN SACRARIVM: NORTH SIDE.





NOTES

ELEVATION.

SECTION

Plan of the great arcade on the transept of the Augustine. All of which stops at bottom as on the spot.

Plan this column and jambs

CAPITAL

Plan of rough arch-moulds

CAPITAL

Plan this pier & column

CAPITAL

Plan of springing of arch moulds & dit in 6th up

Level of Communion Floor and of Pavement at west

CAPITAL

Plan this pier above the loose

Hinge screen.

Level of ambulatory floor

Half section.

Detached perspective sketch of a

CAPITAL

Plan of some of the capitals

Back case

Detached perspective sketch of a

CAPITAL

The small columns have detached bodys cast on to each head of which has been the moulds in most cases.

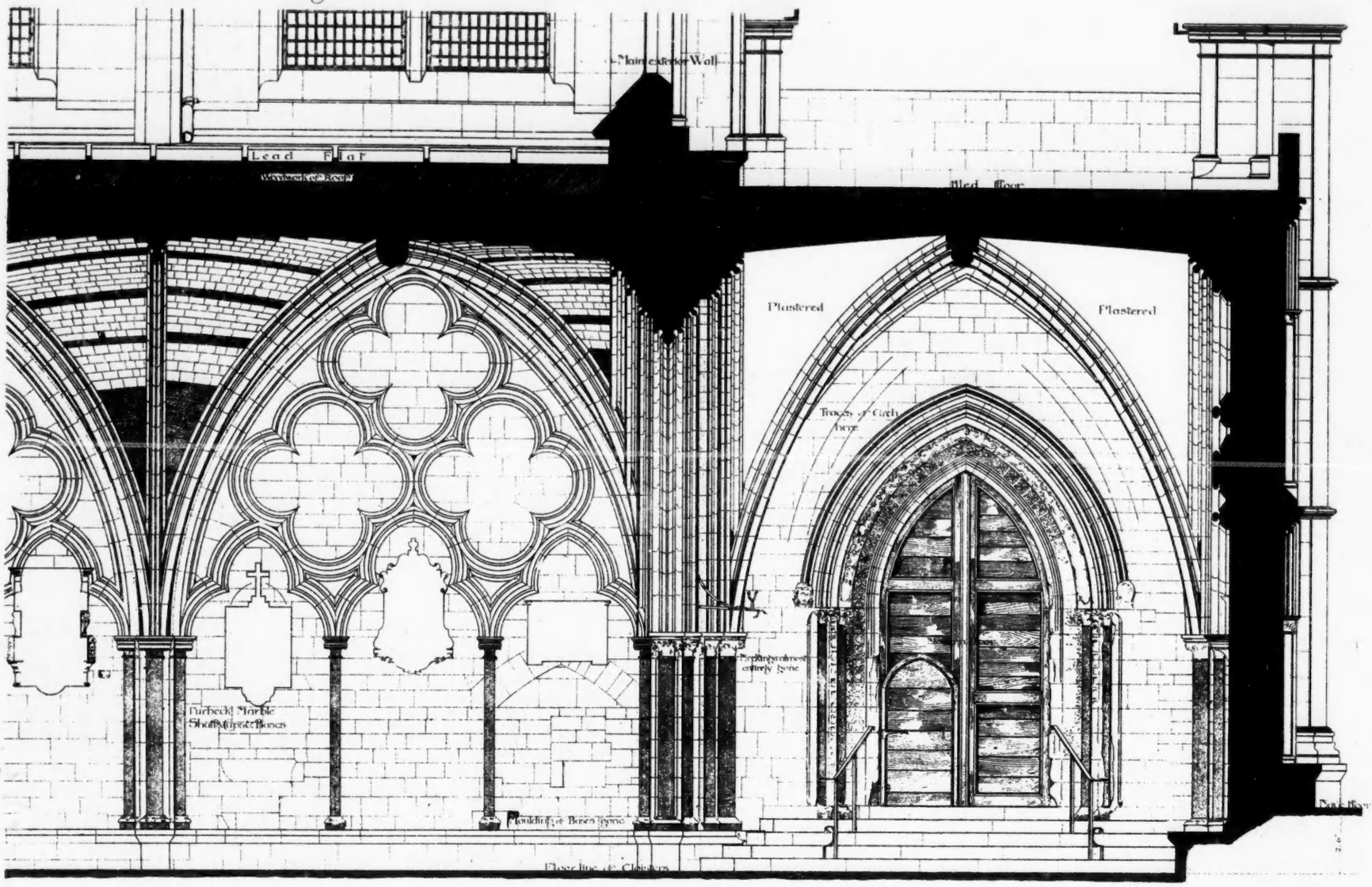
G. Gilyn White

Wyman & Sons Photo-Litho 6 Queen St London W.C.

See D on General Plan.

Westminster Abbey

:Two Eastern Bays: North Walk of Cloisters:



Note. Stone jointing taken from actual measurements

Longitudinal Section looking North

Measured & Drawn by
Mr Thomas Mc Laren.

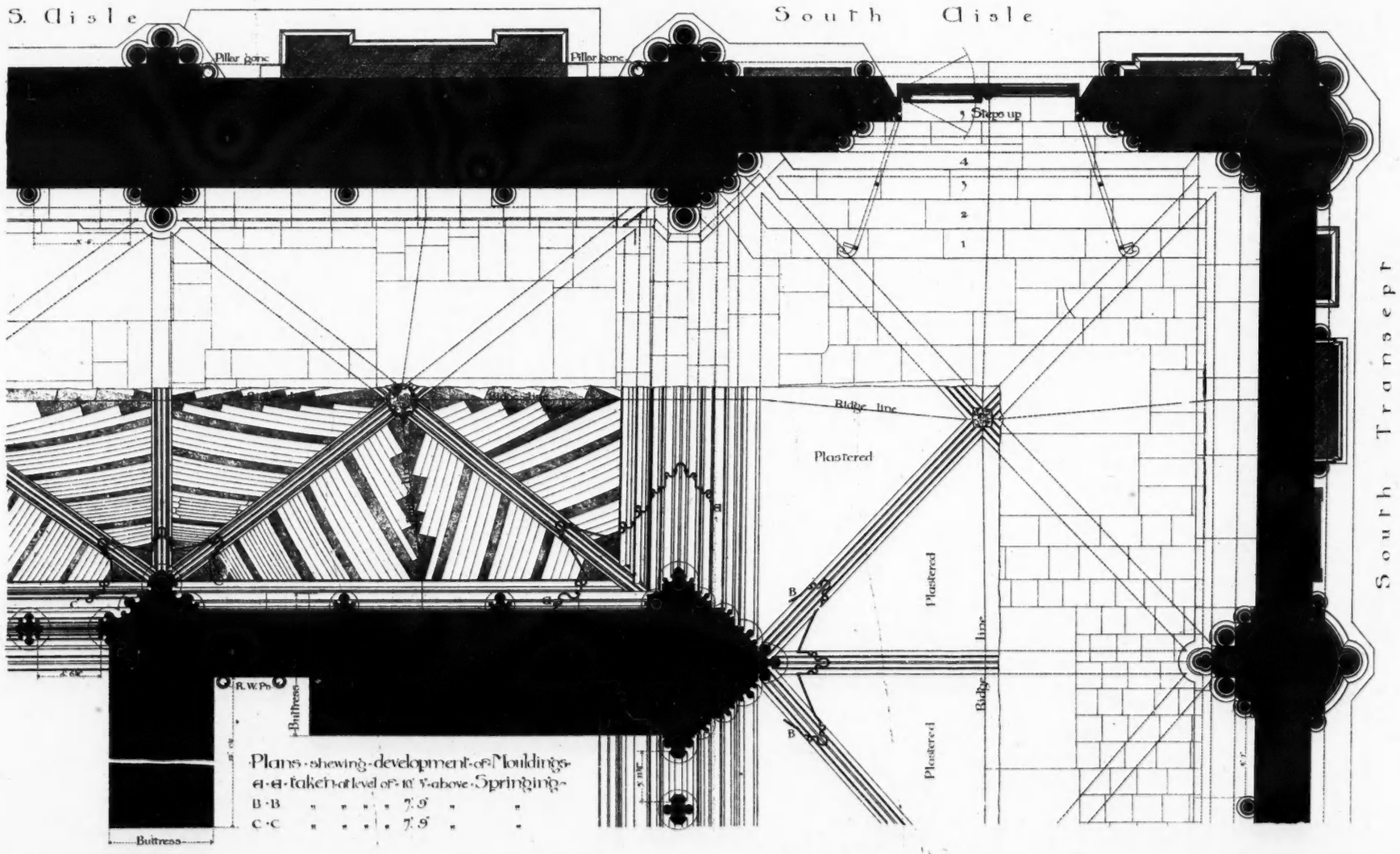
PUGIN TRAVELLING STUDENTSHIP, 1885. MEDAL OF MERIT.

C F Kell Photo-Lith & Printer, 8, Castle St Holborn, London, E.C.

See D on General Plan.

Westminster Abbey

:Two Eastern Bays: North Walk of Cloisters:



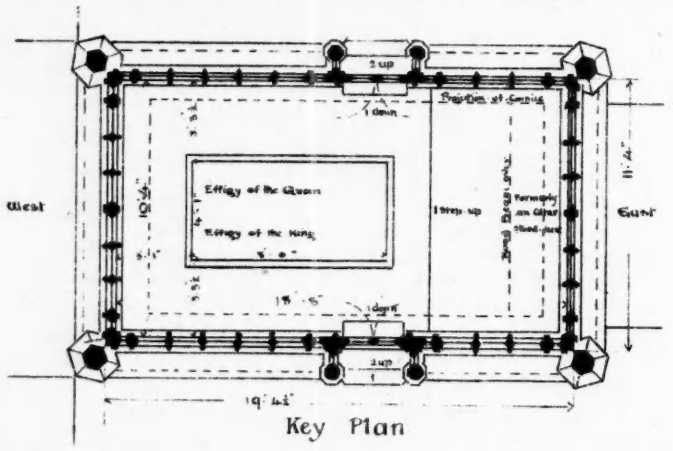
Note. Stone jointing taken from actual measurement

Plan (Half shewing Vaulting)

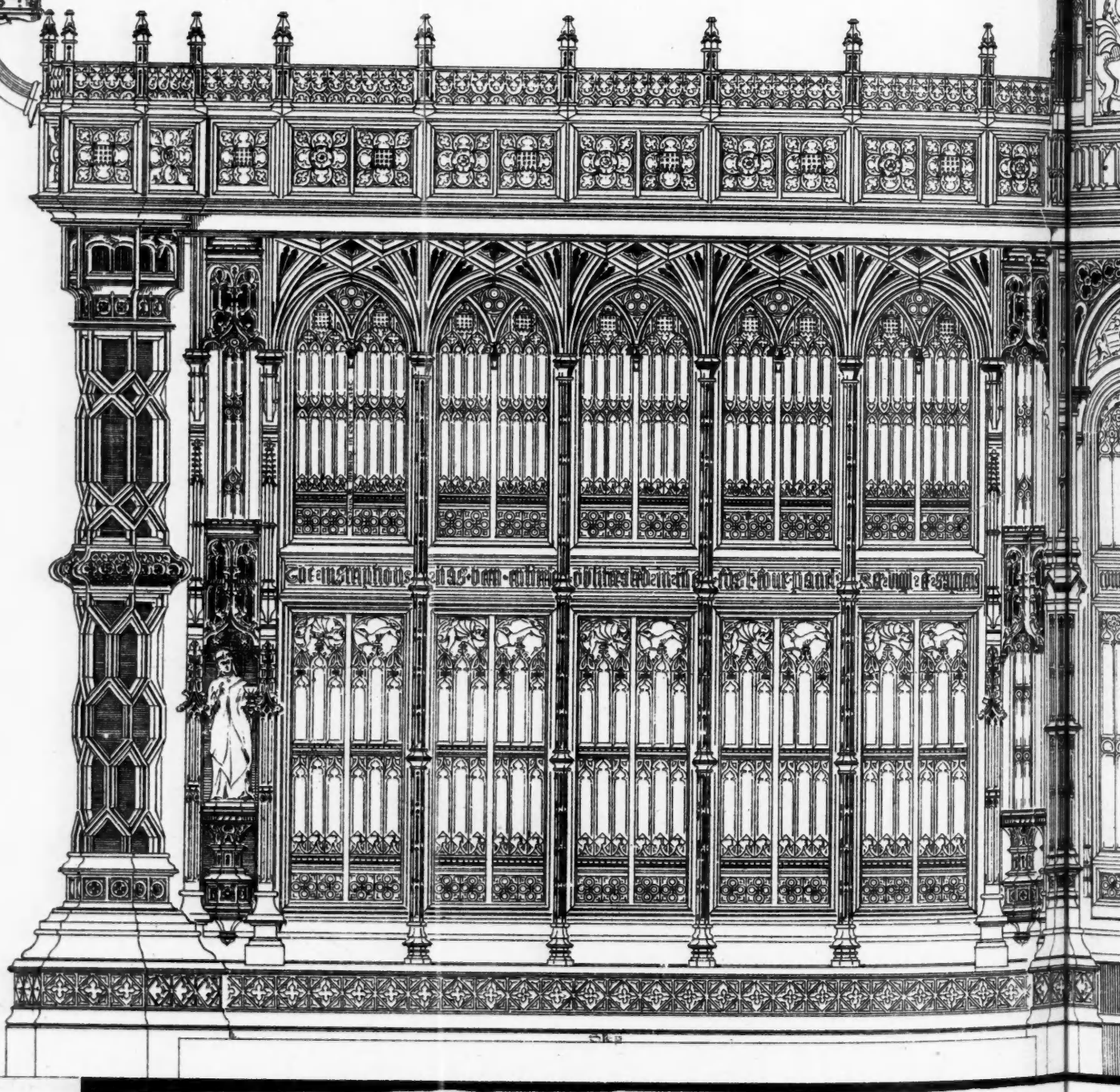
Measured & Drawn by
Mr. Thomas Mc. Laren.

PUGIN TRAVELLING STUDENTSHIP, 1885. MEDAL OF MERIT.

C. F. Kell, Photo-Lith & Printer, 6, Castle St. Holborn, London E.C.



"Rose & Crown" Candle bracket



South E

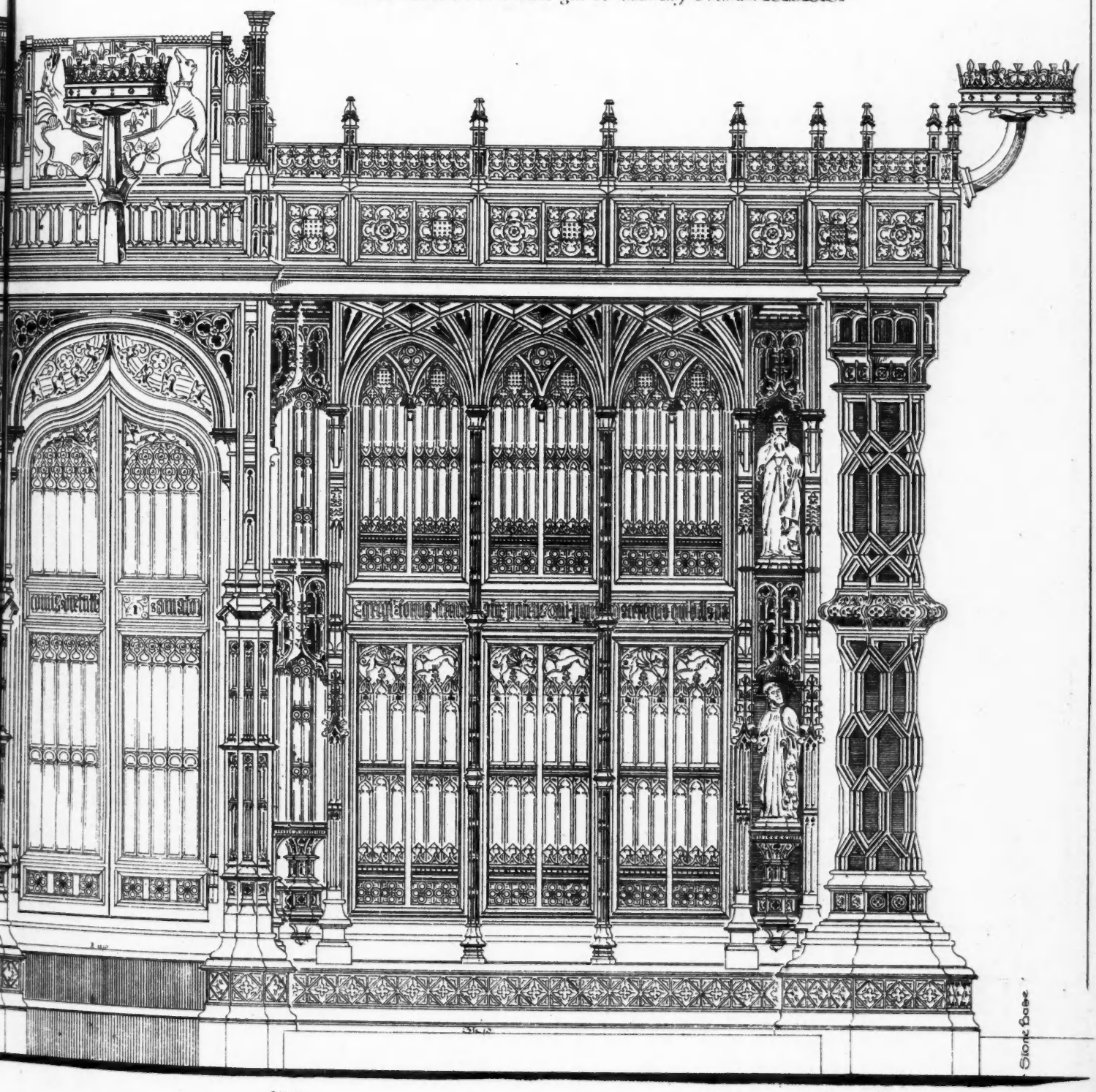
C. F. Kell Photo Lith & Printer

PUGIN TRAVELLING STUDENTSHIP, 1885.
MEDAL OF MERIT.

SCREEN SURROUNDING THE T
IN
WESTMINSTER

See E on General Plan.

Note The Screen has been damaged in places but I have restored the missing parts from similar existing ones where possible
It is executed in Brass painted the colour of Bronze and was originally adorned with 36 Brass Statues gilt of which only 6 remain



Statues missing

King Edward Confessor
St: Bartholomew

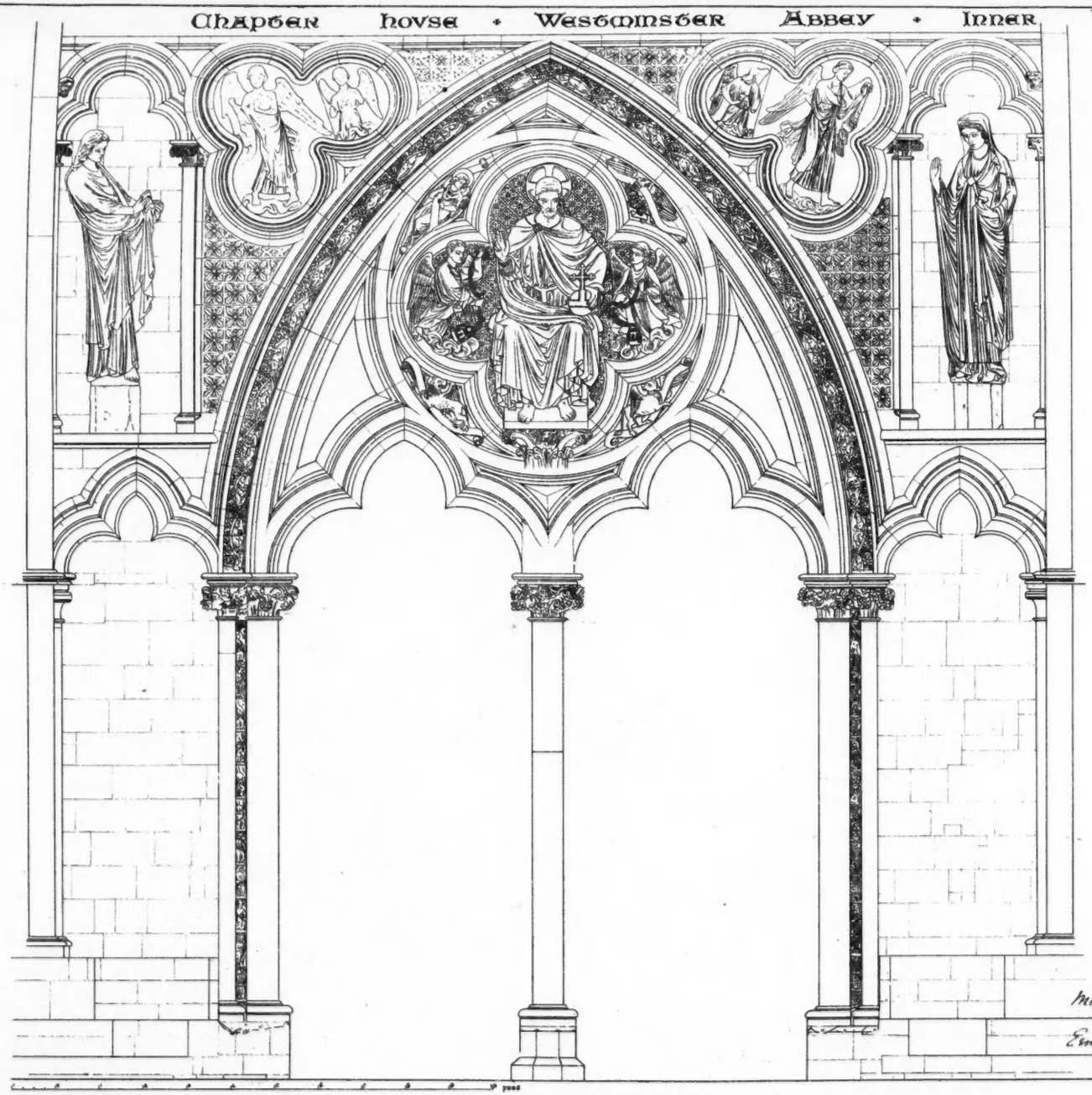
Elevation of Screen

A. Hayward
Archt
1884

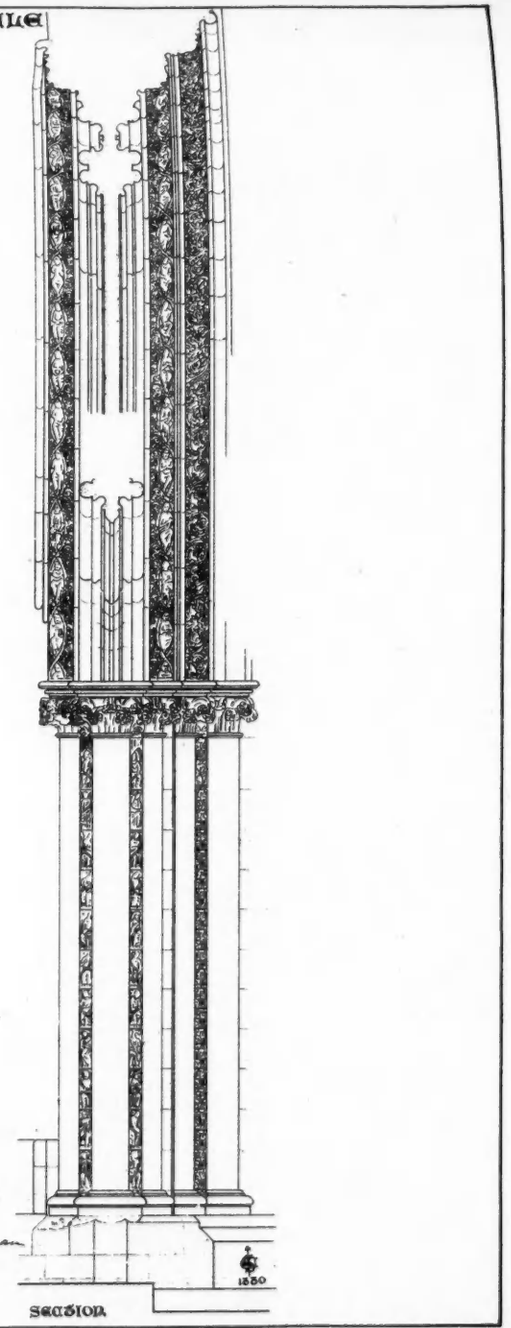
8 Castle St Holborn London E C

HE TOMB OF HENRY VII.
N
TER ABBEY.

Chapter House • Westminster Abbey • Inner Vestibule



Measured & drawn by Ernest C. Shearman



ELEVATION OF GREAT DOORWAY

SECTION

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Ct Queen St London, W.C.

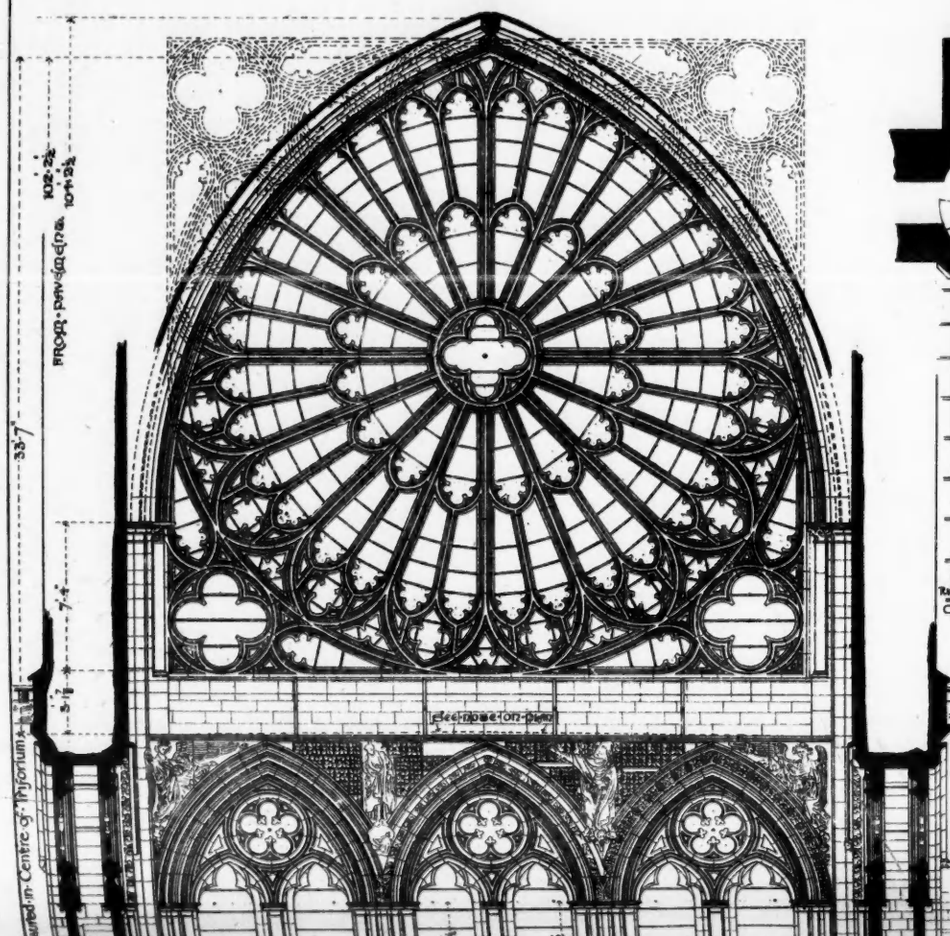
See C on General Plan.

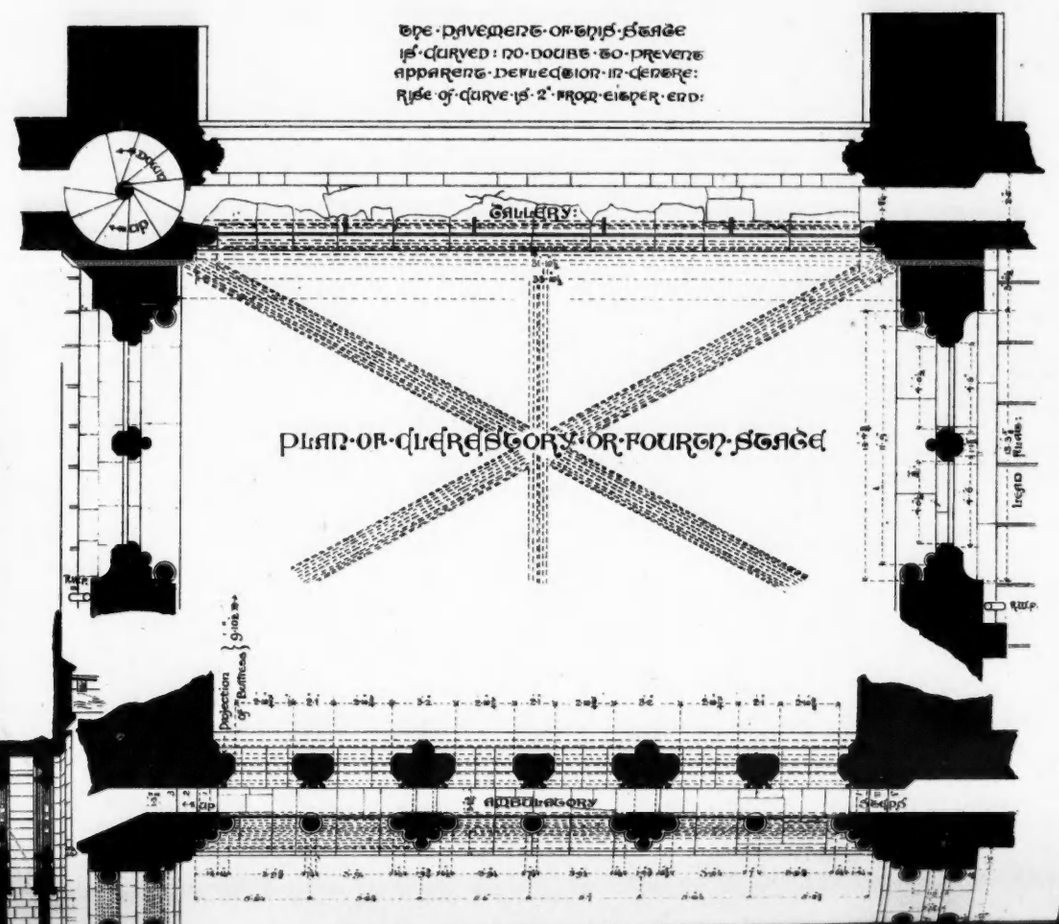
See B on General Plan.

WESTMINSTER: ABBEY
SOUTH: TRANSEPT

N.B. ALL · JOINTING · OF · MASONRY · INDICATED · ON DRAWING · IS · FROM · ACTUAL · MEASUREMENT :

INTERIOR · FACE · OF · SOUTH · WALL · & · PLANS · OF · THE · DIFFERENT STAGES · SHOWING · CONNECTION · WITH · SIDE · WALLS




THE · PAVEMENT · OF · THIS · STAGE IS · CURVED : NO · DOUBT · TO · PREVENT APPARENT · DEFLECTION · IN · CENTRE : RISE · OF · CURVE · IS · 2" · FROM · EITHER · END :
GALLERY
PLAN · OF · CLERESTORY · OR · FOURTH · STAGE
Projection of Buttress
TRIFORIUM GALLERY

PLAN OF TRIFORIUM OR THIRD STAGE

PLAN OF SECOND STAGE

Upper Pair of S. Ryan's Chapels

PLAN OF FIRST STAGE:

Chapel to Standrasp

PLAN OF GROUND STAGE

ELEVATION:

10 5 0 10 20 30 40 50 Feet.

Wyman & Sons. Photo-Litho 6 Queen St London. W.C.

FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

BLACK, WHITE, AND RED LEAD.

THE third lecture of this series* was delivered on the 25th ult. by Professor Church, M.A. The chair was occupied by Mr. Alfred Preston, Past-Master of the company.

Professor Church commenced by saying that although the lecture bore the title of "Black, White, and Red Lead," there was, strictly speaking, no such substance as black lead. There were three ways in which white lead was manufactured. The first was the Dutch process, consisting in taking metallic lead in the form of a grid and coiling it, or placing a coil of sheet lead in a crucible or vessel containing vinegar, and surrounded by a quantity of fermenting tan or manure. A large quantity of carbonic acid was thus given off, and was the chief agent in the manufacture of white lead. Two other constituents entered into its composition, the one being the oxygen of the air, and the other being water in the form of vapour. The result of these was to produce an attack on the metallic lead, which was a pure elementary substance, and in the end they got the metallic lead with its shining surface thoroughly corroded, —a mass of white lead with lead in the centre. The next process was a much simpler one, but required a great deal of attention. It was invented by a French chemist, and was also practised in England by a chemist named Benson. In this case carbonic acid gas from any source, such as that resulting from the action of acid upon chalk, was passed into a solution of acetate of lead. The acetate contained oxide of lead in excess of the quantity requisite to form it, and when the carbonic acid was passed through it a white powder was deposited in the form of white lead. The third process was invented by two chemists,—Dale and Milner. In this instance, a yellow combination of lead and oxygen was used in the proportion of four parts, with common salt one part, and water sixteen parts. These were ground together for four or five hours. The mixture was then transferred to a leaden vat, and on carbonic acid gas being passed through it to a certain point, they got white lead. There was still another process, but as it produced white lead of an inferior character, he would not deal with it. White lead consisted of two substances, not always present in exactly the same proportions, but very nearly so in all good samples. It was a compound of two proportions of carbonate of lead and one proportion of hydrate of lead. The following was the chemical formula of white lead:—

$$PbH_2O_2.2PbCO_3.$$

Sometimes the samples were grey, arising from the grid or core not being separated from the white lead, a small quantity of finely divided lead spoiling the white tone of the mass outside. Occasionally a sample would appear yellowish, caused by one of the oxides of lead being present. Another defect of white lead arose from the presence of too much hydrate of lead. It sometimes contained too much carbonate of lead, and then it would not grind readily. It was desirable that white lead should be thoroughly washed from sugar of lead if it was to be used for the finest work,—and, indeed, it was better for all work. The lecturer then referred to Venice, Hamburg, and Dutch white lead, demonstrating by experiment how to tell whether the material was adulterated. Nitric acid was a useful agent for detecting adulteration. He had bought several samples, and found that the majority were unadulterated, but in employing house-painters he had detected that the paint with which they had been supplied had been adulterated. The advantages of white lead were body and density, its drying character, and its economical union with oil containing the particles of paint and the surface on which they were spread. This was to be seen in the case of old oil paintings and old putty made only of white lead and linseed oil. In the National Portrait Gallery they would notice that the parts of the pictures which had been best preserved were the high lights, in which flake white had been largely used. The preservative effect of the flake white formed a lead soap, and a hard substance which was almost imperishable. The disadvantages of white lead were that it discoloured and was poisonous. Peroxide of hydrogen would get rid of the tarnish of lead. White lead, again, would dissolve in the acids of the stomach, and in cases of lead poisoning there was a peculiar effect to be observed: at the point where the teeth joined the gums there was a slaty blue line. This arose chiefly from want of care in eating with unwashed hands, and sometimes from the powdered lead being inhaled and swallowed. There were two remedies for lead poisoning; a pleasantly acidulous drink of diluted sulphuric acid turned the white lead into sulphate of lead, which was practically insoluble. The other remedy was iodide of potassium, which should be carefully used. A specially prepared respirator was a most important precaution. A species of white lead which was practically non-poisonous had lately been introduced. It was a sulphate of lead, to which was added a small quantity of zinc white. Red lead was the densest of the three, and often was made by roasting white lead. It was an oxide of lead, and its formula was:—

$$Pb_3O_4.$$

Red lead when boiled with oil had a great power of drying and preserving wood. It was sometimes adulterated with brick-dust and red oxide of iron. Weak nitric acid dissolved red lead into a clear solution by the addition of a little bit of sugar. If the red lead contained brick-dust or oxide of iron, they would not dissolve. Black-lead was carbon, and was as much an element as oxygen. The carbon existed in three forms,—in diamonds, black-lead, and charcoal or soot. Graphite or plumbago was a better term than black-lead. Graphite had been said to be the only perfect pigment, and would stand a high temperature. Black-lead was adulterated with ground anthracite coal, and with gas carbon from the retorts. Graphite would stand a fire-red heat without burning, while the soot or carbon burned away.

The fourth lecture was delivered by Mr. Thomas Blashill, F.R.I.B.A., on Wednesday evening last. The subject treated of in this lecture was "The Shoring of Buildings." The lecture was very fully illustrated by models and drawings, and the large hall was completely filled by an attentive audience. We defer a report until next week.

* For reports of the two previous lectures see p. 264, *ante*.

PUBLIC WORKS AT BRUSSELS.

THE Communal Council of Brussels has applied to the Belgian Government for authority to spend 55,720*l.* during the current year for the completion of primary schools. There is a school in the Rue Haute, which will cost more than 10,200*l.*; another in the Rue Schaerbeck, 4,000*l.*, and a third, Impasse Canivet, estimated by the architect, M. Samyn, at 20,440*l.* But these are not the only expenses that the town is incurring for the promotion of education. The building of the Royal Athenæum cost 19,884*l.* in 1883 and 40,000*l.* in 1884. This important structure will be completed during the course of the present year for a further cost of about 20,000*l.* When we consider that Brussels is, after all and comparatively speaking, a small town, this expenditure in the noble cause of education is very creditable. But there are many other calls on the public purse. The tourist and the student of Renaissance and Gothic architecture will rejoice, this year, in the restoration of the Maison du Roi. This celebrated building, formerly used as the seat of local authorities, was built from 1514 to 1525. Here it was that Counts Egmont and Horne were confined the night before their execution. To prevent a rescue, planks, it is said, were placed, reaching from the balcony to the scaffold, situated in the great square. Thus the building is intimately associated with the independence of the Netherlands and the rebellion against Catholic and Spanish domination. In 1767, this structure, which is also sometimes designated as the Halle au Pain, was most clumsily and inartistically restored. Some years ago the original plans were found, and, in 1873, it was determined to efface the traces of the previous restoration, and reconstruct according to first and superior designs of the sixteenth century. On this work close upon 40,000*l.* have been spent, and during the present year 8,000*l.* more will be required, principally for fixtures, doors, &c. M. Jamaer has completed his studies of the galleries and balconies, and the gallery leading to the office of the Burgomaster is almost finished. In the Gothic hall two large bronze statues will be placed, but the models of the nine other statues, also required, have not yet been approved by the Fine Arts Commission.

Early in the year works for the Provincial Government House of Brussels will be put up for competition. The details concerning these adjudications fill a volume of 628 pages; and, according to the calculations of M. Hans, the principal engineer of the Ponts et Chaussées administration, the total cost is put down at 98,280*l.*, and the caution money required from the contractors, at 4,920*l.* These works relate principally to the enlarging, deepening, &c., of the Brussels and Charleroi Canal. There will be also ten aqueduct syphons, five draw-bridges, ten ordinary bridges, together with pavement, embankments, &c. To explain all these details it has been necessary to draw up sixty-five different plans; and the entire work must be completed in two years, or a penalty of 100 francs for every day's delay will be inflicted. Something also is to be done with respect to the beautifying of Brussels, and the housing of the poor; 44,000*l.* will be devoted to the transformation of the small district of La Vierge Noire,—a quarter which has barely 400 inhabitants. Finally, 24,000*l.* are put down for continuing the improvement and development of the north-east or fashionable Quartier Leopold. Altogether it will be seen that neither political disturbances nor commercial depression have checked the forward movement of the town of Brussels. No important project has been abandoned, and many new proposals are seriously entertained. This is most fortunate, as the number of workmen out of employ is daily increasing, and the distress would be doubly keen if the Government as well as private enterprise failed in providing work.

ARCHITECTURAL SOCIETIES.

Glasgow Institute of Architects.—The annual dinner of the Glasgow Incorporated Institute of Architects took place at St. Enoch's Hotel on the 27th ult. Mr. James Sellars, President, occupied the chair, and Mr. David Thomson, ex-vice-president, was croupier. The Chairman, in proposing the toast of "The Institute," said that the names of such men as the late Alexander Thomson and James Salmon, George Bell, John Baird, and John Burnet, would long be remembered as the fathers of the Institute; and, thanks to the efforts of those men, and of those who came after them, the Institute had long ago entered on a useful career, doing good earnest work in the past, taking part in all matters of public interest connected with the architectural profession, and justifying its claim to a position of influence among similar societies in Glasgow. With regard to architectural education, Mr. Sellars said that a Chair of Architecture at the University was required, in order to secure the status and the proper recognition of architecture as one of the learned professions. Referring to the "Alexander Thomson Travelling Studentship," the funds for which will be available in about two years, Mr. Sellars said that a sum of money was collected by the friends and admirers of Mr. Thomson at his death, and after providing a bust of the deceased architect, which is now in the Corporation Galleries, the balance has been invested, and every three years a sum of 60*l.* or 70*l.* will be available and competed for by young architects, the successful candidate being awarded the money, under certain conditions, to help him in his studies. No more fitting tribute, said Mr. Sellars, could be paid to the memory of Alexander Thomson, who was himself an earnest student all through his too short career, and it will be the means of handing down to posterity the name of one of Glasgow's most distinguished architects. Something is also being done for the architectural education of the young men in the profession, and that by the young men themselves. The Glasgow Architectural Association is doing excellent work in this way. Mr. Sellars concluded by referring to the proposed Police Bill for Glasgow and to other matters of local interest.

Birmingham Architectural Association.—The sixth ordinary meeting of this Association was held at Queen's College on Tuesday evening last. Mr. H. H. McConnal was in the chair.

A paper was read by Mr. W. Doubleday on "Symbolism in Art," which was copiously illustrated by diagrams and sketches. The lecturer expressed his opinion that the age of symbolism had not passed away, and that in modern architectural works the necessity of symbolic representation would frequently occur, more especially in all buildings erected for the worship of the deity. A vote of thanks to the lecturer was proposed by the Chairman, and supported by Messrs. Victor Scruton (hon. sec.), J. Cotton, and F. Cross.

THE FOLK-LORE AND ART OF OLD JAPAN.

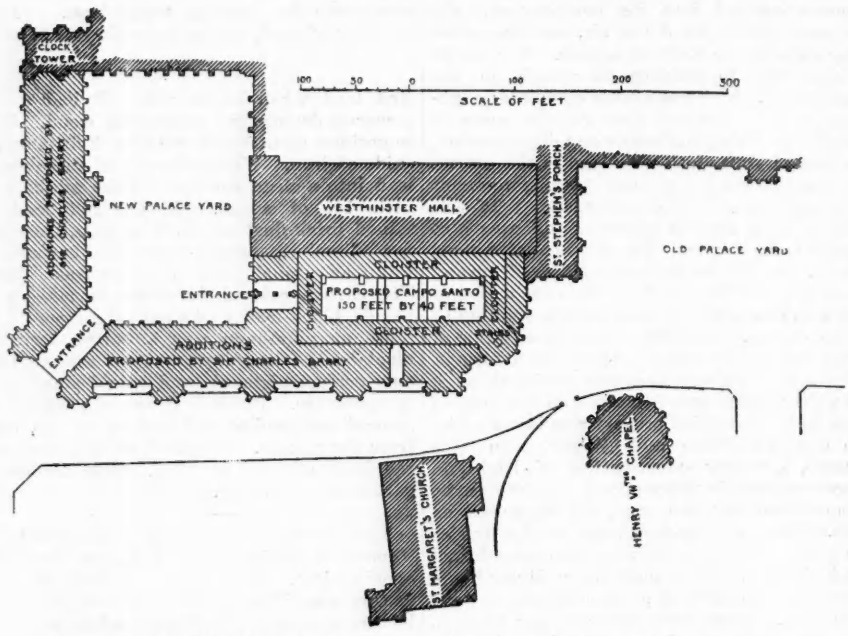
THIS was the subject of an interesting lecture delivered by Capt. Charles Pfoundes, F.R.G.S., at the meeting of the Society for the Encouragement of the Fine Arts, Conduit-street, on Thursday evening, the 26th ult. The chair was occupied by Sir J. Whittaker Ellis, Bart., M.P., and vice-president of the society. The lecturer pointed out that the art of Old Japan, that is, the true art of the cultured natives, derives so much of its art motive, and so many of its ideals, from the folk-lore, the myths, and legends, that we must know something of these before we can properly understand the art, or have any true conception whatever of the meaning, the origin, of the compositions that are so ably depicted in the characteristic Japanese delineations. In the decorative design of wares, even of those fabricated for foreign use, however cheap, we find those well-known groupings that to the native, and also to the well-informed foreigner, recall the most popular poetic ideas, the best known legends, and the numerous plots of romance or play, so familiar to all classes of the Japanese. Beginning with the native myths, the Japanese story of the Creation, when from Chaos order was evolved; then the successive acts of creation of beasts of the field, birds of the air, fishes of the sea, and semi-divine man, we follow on from legend to legend, throughout the most important epoch of Japanese history. War and love, loyalty and revenge, efforts to improve the condition of the people, to civilise the rude aborigines, all form salient features in the art work of the designers. Besides the pictorial art and book illustration, the caligraphic art takes a high place. In a former lecture before the Society on the System and Meaning of the Art of Old Japan, some of these points were dealt with by the author, and in a still earlier lecture he essayed to elucidate the connexion between the art and the literature, and entered somewhat fully into the caligraphy, of the Japanese. It was not necessary, therefore, to again travel over that portion of the subject, but a little explanation might bear repetition, as to the peculiarity of the written character, and why it affected the art so much. As it is not an alphabet or a mere syllabary, but an ideographic character, derived from hieroglyphic forms, it appeals to the eye, beyond its mere phonetic value; and in illustrations of myth legend, or curious rite or custom, a few of these Chinese written characters, as used by the Japanese, throw much light upon the suggestive sketch as to the intention of the artist. The enamel and cloisonné wares called "seven jewels" show the seven colours: pink, coral, amber, mother-of-pearl, emerald, agate, pearl, and crystal; gold and silver are included in the term, as a matter of course, and it is interesting to find these groupings in ancient Indian and Chinese jewelled articles intended for religious uses. Whilst the Japanese have incorporated much from the adjoining continent of China, all this appears as merely engrafted on the indigenous stock; and the scholarly native draws a sharply-defined line between the "foreign" and the "native" myth, legend, and poem. Whether in wood or ivory carving, in bronze casting, in inlaid metal, or other work, the same series of ideas are found repeated and perpetuated; but the Japanese are judicious and expert in the selection of material, and of design to suit the uses and the forms of the articles. Indeed, an extensive knowledge of the daily life, the manners, and the ceremonies of the people of all classes, is absolutely essential for a true understanding of the art of this most interesting people. Unfortunately, in recent years, they have diverged widely from the traditional lines, and are sinking into imitation, not only of foreign wares, but actually are copying foreign imitations of their own older wares, now scattered over the face of the earth, and much of which is to be found, not duly valued or appreciated, anywhere but in Japan. With our modern arbitrary art canon and recent "scientific educational" art machinery, we cannot criticise Japanese work in its detail of execution; but in the sketch, or group depicted on any Japanese article, in the "lozenges" that contain the "blazon" of an ancient clan, much will be found of deep interest. The realistic and servile copying of the beautiful Nature that the Japanese is so happily surrounded by, and which he so thoroughly appreciates, is not the sole *forte* of the Japanese artist; but to grasp the idealistic art, to adequately enjoy its beauties and depth of meaning, one must undergo a course of training, a long series of studious investigation into classical and native literature, into history, legend, poem, and folk-lore.

amongst them a little more. He was quite sure that many of them would be very pleased to comply, for architects could not but feel their indebtedness to such men as were to be found amongst the members of the Institution. He should like to see an eminent architect like Mr. Waterhouse occupying their chair on such an occasion as the present.

WESTMINSTER HALL.

SIR,—The appearance of the beautiful drawing of the late Sir C. Barry's design for completing the new Palace at Westminster in the *Builder* of Jan. 24 shows evidently that the public are interested in the completion of the surroundings of Westminster Hall.

I venture, therefore, to inclose a sketch plan containing an idea for devoting the central space, called "The Hall Court," to the purposes of a "Campo Santo." I wish it to be considered an addendum to Mr. Barry's plans, and not in any way conflicting with them.



Suggestion for Devoting the Ground formerly occupied by the Law Courts at Westminster to a Campo Santo.

The grand idea of Sir Gilbert Scott to devote a large portion of Abingdon-street to the object I have in view will probably never be carried out. I therefore submit the scheme with greater confidence, because it can be initiated at once, and at no expense for purchasing the land, &c.

As far as I can gather from your pages, professional opinion is generally opposed to Mr. Pearson's proposal to cover and inclose the space between the flying buttresses as a stand for horses. This would be sacrilege!

The idea I submit does not in any way interfere with Mr. Barry's plan, except that it narrows St. Margaret's-street in order to obtain a more rectangular quadrangle for my suggested Campo Santo. This I propose to be 150 ft. by 40 ft., with a cloister about 20 ft. wide round it. This cloister might be two stories in height, and would provide accommodation for tablets, busts, and statues for the illustrious dead, whose remains would be deposited in the central space, or Campo Santo, for many years to come. Access could be obtained from New Palace Yard and St. Margaret-street, and from Westminster Hall, and a circular staircase would connect the two floors. J. W. WALTON-WILSON.

*** Of course, as will be seen, Mr. Walton-Wilson's plan involves setting the line of the new buildings parallel to Westminster Hall, and therefore producing that narrow strait in St. Margaret's-lane which Mr. C. Barry's plan was specially modified to avoid.

PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS.

THE annual dinner of the members and friends of this Institution took place at the Holborn Restaurant on Saturday, the 28th ult., the Governor, Mr. George Plucknett, J.P., in the chair, supported by Mr. F. J. Dove, Mr. W. Scrivener, Mr. Hall, Mr. Thomas Stirling, and several other master builders and builders' merchants. The company numbered upwards of 130.

The Chairman, in proposing the toast of the evening, "The Provident Institution of Builders' Foremen and Clerks of Works," asked all who were present to do what they could in support of so excellent an institution. Such support could, perhaps, best be given by making known the objects of the Institution to those for whose advantage it was established, now upwards of forty years ago. The annual income at the disposal of the directors was very limited, but, small as it was, it enabled them to do a great amount of good. There were, he hoped, many builders' foremen who would some day be masters, and he hoped they would not then forget the claims of the Institution, which had two classes of members, viz., ordinary members and honorary members. The first-named class of members subscribed to, and were entitled under certain conditions to participate in, the Provident Fund.

Mr. Bedford, the secretary, in responding, said that among the members of the Institution who had risen to be masters, was the late Mr. William Bangs. Since its establishment, the Institution had expended the sum of 5,639*l.* 15s. in affording relief and granting pensions to infirm and aged members, their widows and orphans. In conclusion, Mr. Bedford referred to the great services which had been rendered to the Institution by Mr. Plucknett as Governor during the last sixteen years.

Mr. George Groome, vice-chairman, next proposed "The Governor," Mr. Plucknett briefly replying.

The other toasts included "The Trustees," proposed by Mr. J. Derry, financial secretary, and coupled with the names of Mr. W. Scrivener and Mr. J. Dove; "The Builders," proposed by Mr. Ross, and responded to by Mr. Hall; "The Officers of the Institution," proposed by Mr. Johnson, and replied to by Mr. Welch, treasurer; and "The Architects and Surveyors," proposed by the Chairman, and responded to (in the absence of an architect or surveyor) by Mr. Thomas Stirling, who suggested that architects should be invited to come

The Alexandra Home for Lady Students of Music.—We are informed that the American Elevator Company have been instructed to furnish one of their "Standard Hydraulic Elevators" for passenger service in this building, which is being erected in connexion with the Royal College of Music, as a home for those of the lady students of the college whose homes are out of London.

TREDGOLD'S CARPENTRY.

SIR,—I am much obliged to your reviewer for pointing out some typographical errors that have accidentally occurred in the new edition of this work; these will all be corrected before any more copies are issued by the publishers.

With regard to the apparent error in "integration," at page 50, upon which the reviewer has laid so much stress, I beg to say that it is simply the omission of the figure "4" before l^3x in printing the equation of the second integration.

Your reviewer suggests that I "might have drawn the line at the calculus"; but in this respect I only followed the example set by previous editors and by Tredgold himself, who used the "calculus" in several parts of the work.

Allow me to say that especial attention was paid to the revision of the "Tables of Scantlings," every scantling being carefully considered; in some cases it was thought inexpedient to adhere strictly to the results obtained by the formulæ, but in general those results have been tabulated with some allowance for contingencies.

In the references to other works the "page" has been purposely omitted, as many of them have gone through several editions, and it appeared to me that giving pages would in many cases tend only to mislead and confuse the reader.

E. WYNDHAM TARN.

TAXATION OF SURVEYORS' CHARGES IN COMPENSATION CASES.

SIR,—In the interests of surveyors, and also in those of owners whose property may be required by public bodies or railway companies, we think it right to bring to your notice the facts as to a compensation case in which we have been engaged on behalf of the land-owner, with reference to the unfair and merciless manner in which the surveyors' charges have been taxed by Master Francis.

In the early part of the year 1881 the Kingston and London Railway Company gave notice to take some twenty acres of land and good dwelling-houses, with large gardens, &c., situate at Wandsworth, and a claim was sent in by us amounting to 42,861*l.* The case was taken to arbitration, and an amount of 34,500*l.* was awarded as compensation in March, 1884, the business having been in hand nearly three years.

This case required a great deal more consideration than is usual, in consequence of its dealing with building land, ground-rents, severance, and consequential damage.

The railway company had five surveyors, all of whom gave evidence, and two counsel were employed by the company.

We acted as the claimant's surveyors, and our Mr. C. W. Lee was her arbitrator, and gave evidence before the umpire, being supported by Mr. Driver, Mr. Galsworthy, and Mr. Bousfield, who were all called and gave evidence.

The surveyors' charges were as under, viz.:—

Mr. C. W. Lee (arbitrator) for valuations, reports, plans, and all other services extending over nearly three years, and attending on three days and giving evidence before the umpire, and several disbursements	£292
Mr. Driver, also valuation and report, and witness in support and giving evidence two days before the umpire	201
Mr. Galsworthy, ditto, ditto	201
Mr. Bousfield, ditto, ditto	201
Total	£895

The bills were taken before Taxing-master Francis for taxation, with the following result:—

	£.	s.	d.			
Mr. Lee was allowed qualifying fee...	31	10	0			
and two days' attendance...	6	6	0			
				37	16	0
Mr. Bousfield, ditto	31	10	0			
and ditto	6	6	0			
				37	16	0
Mr. Driver, two days' attendance only..... (No qualifying fee)				6	6	0
Mr. Galsworthy, two days' attendance ..... (No qualifying fee)				6	6	0
Total				£88	4	0

There is an utter want of principle shown in the method of taxation.

Mr. Lee, whose work extended over about three years, is only allowed the same amount as that given to Mr. Bousfield, one of the supporting witnesses, whilst Mr. Driver and Mr. Galsworthy, who were in precisely the same position as Mr. Bousfield, were each allowed one-sixth of the amount allotted to that gentleman.

The scale of fees allowed is also entirely inadequate, being less than one-tenth of the amount charged, Messrs. Driver, Galsworthy, and Bousfield having charged on Ryde's scale, plus 3*l.* 3*l.* per diem for attendance before the umpire, and Mr. Lee's charge being a moderate one for the amount of work done.

If the bills of claimants' surveyors are to be dealt with in this manner by taxing-masters, it will become necessary for the claimants to add their surveyors' charges to the amount claimed as a separate item of compensation, and these charges will have to be seriously considered by the tribunal sitting in judgment on the case.

LEE BROS. & PAIN.

"NON-ACCEPTANCE OF LOWEST TENDER."

SIR,—Observing some letters on the above subject in your valuable columns, it has struck me to suggest to builders, contractors, and, in fact, to all firms who are constantly giving tenders for doing certain work and for the supply of goods, that they should resolve to refuse to tender when it is stated in the specification "that they [the authority] will not bind themselves to accept the lowest or any tender"; and in order to accomplish this I would suggest the forming of an "Association" or "Defence League," with a large representative committee, to enlist firms willing to be members, and to organise branch leagues, so that every information could be gathered on any such tender in existence, and, if necessary, to bring their grievances before Parliament. With a combined movement of this kind, I am sure it would succeed in stopping such secret practices and favouritism as are known to exist. This is a matter I have often thought about, and I am willing to start an honorary movement of this kind if firms who would be willing to join will communicate with me, and if I find plenty of such support, I will ask you again to assist me by giving publicity to the movement.

WM. ANDREW WILLIAMS.

No. 4, Brighton-terrace, Foxberry-road, Brockley.

THE ROYAL ARMS.

SIR,—"M. of M.," "J. B.," and other Scotch enthusiasts, are in error on the subject of what they call the national arms of Scotland. What they speak of are the arms of the sovereign,—individual, personal property. If the sovereign of the United Kingdom chooses when in Scotland, from amiable condescension to weak national vanity, to alter the arms as usually borne, he or she can do so: they are dealing with their own; but it is absurd of the Scotch people making claim to such alteration as a right, as though the arms belonged to them. As a matter of common sense, England, being the greater nation, the arms of its sovereign, as derived from Henry II., should take precedence when in combination with those of James VI., as both cannot be first. The arms of *Scotland* are the St. Andrew's cross; of England, St. George's cross.

P. E. MASEY.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

8,526, Locks for Railway Carriage Doors W. H. St. Aubin.

The body of the lock-case is cast in one piece, to it is fitted the front end. The bolt of the lock has circular bosses at each end working in circular holes, formed partly in the sides and partly in projections from the front. In place of the mainspring generally used, the bolt bears upon one end of a lever and is centred at about the middle of the lock, and the other end of the lever is connected to a spring. The great advantage is the replacing of the spring, which is likely to get out of order, by a device which, answering the same end, is staple and far less likely to get disarranged in working.

145. Fire-grates and Stoves. J. Bate.

The fire-grate is divided by a grating or partition, and the space behind is used for burning cinders or small coal whilst larger coal is consumed in the main portion of the grate. Thus a cheerful fire may easily be maintained. The grating may be replaced with a fire-basket with fine perforations, which answers the same purpose.

408, Spades, Shovels, &c. T. Parkes.

The piece joining the blade to the handle is made wedge-shaped, and is furnished with a double flange on each side. It fits into a wedge-shaped slot on the blade, and the flanges are then riveted to the blade.

164, Sash-fastener. F. Lea.

A curved lever is actuated by a projection over the lever of the ordinary sash-fastener, so as to bring a part of the fastener at right angles across the meeting-rails of the sash, from which position it cannot be moved from without.

2,123, Combination Tool for Gasfitters. G. Plumpton.

This is a modification of the ordinary gas pliers, with the handles widened out so as to receive a solid screwing die as near to the joint as possible. Square lugs on the die fit into corresponding holes in the handles, which again may be utilised upon the removal of the dies for turning an ordinary tap or receiver. If desired, cutting-tools in place of the screwing-tools may be substituted.

4,176, Constructing and Applying Blocks for Building. W. R. Cornell.

This is a method of constructing and applying blocks of concrete, &c., for building and other purposes, and for ventilation. The blocks are applied in forming air spaces or passages in the walls of a building through which foul air may be withdrawn from within the building by the action of the heat from the ordinary fires, and either be discharged into the outer air, or burned in the said fires as may be desired. The walls are built of concrete with a deep depression on one face, and these leave an open passage in the section of the wall which is utilised for the extraction of foul air, &c.

APPLICATIONS FOR LETTERS PATENT.

Feb. 20.—2,312, J. Butterworth, Hot-water Supply Apparatus.—2,316, R. Welford and Others, Sanitary and other Pipes.—2,315, J. Bewick, Roofing or other Lath or Wood Cutting Machines.—2,319, T. Normanton, Water-pipes and Flushing Cisterns to prevent bursting by frost.—2,323, G. Oulton, Soldering Irons heated by Gas-jet or Flame.—2,326, J. Smith, Mounting or Attaching Door-handles.—2,349, A. Clark, Combined Truck and Ladder.

Feb. 21.—2,360, H. Fletcher, Protracted Set Square.—2,364, P. Hanway, Water-closet Seats or Covers.—2,373, B. Gordon, Flushing Apparatus.

Feb. 23.—2,408, C. Harvey, Ventilating Sewers, Drains, Cesspools, &c.—2,412, J. Tulloch, Sash-cased Window.—2,424, T. Dykes, Improvements in Girders.—2,451, M. Bressac, New Industrial Product to be used as Panels and Hangings in Relief.—2,453, G. Messenger and S. Messenger, Ventilators and Chimney Cowls.

Feb. 24.—2,488, G. Andrews, Alarum for Street and other Doors.—2,492, F. Humpherson, Water-waste Preventer.—2,507, A. Common, Sealing Doors or Manholes against Escape of Air and Gas.—2,508, A. Common, Water-closet Apparatus or Fittings.

Feb. 25.—2,542, J. Sunderland, Improvements in Hoists.—2,566, J. White, Ventilating Cowls.

Feb. 26.—2,617, W. Eglin, Improvements in Seats.—2,626, J. Stevens and C. Major, Spring Hinges for Doors.

PROVISIONAL SPECIFICATIONS ACCEPTED.

16,278, R. Griffin, Back Stop or Bench Knife.—202, A. Boult, Improvements in Stoves.—384, F. Silk, Fastenings for Windows and Casements.—609, E. Tomlinson, Ventilation, &c.—685, S. Von Kosinski, Ventilating, Heating, Drying, and Disinfecting Buildings, &c.—718, J. Herbert, Fret or Piercing Saw Frames.—743, W. Bayliss, Construction of Silos.—746, G. Pickett and G. Skinner, Curing Smoky Chimneys.—1,000, J. Tait and Others, Draught and Dust Excluders.—1,102, R. Warwick, Colouring and Permanently Decorating Surfaces of Plastering Work.—1,284, J. Horne, Appliances for Breaking up Solid or Compact Refuse in Sewers and Drains.—1,408, T. Amos, Improvements in Water-closets.—1,589, A. Roberts, Apparatus for Distributing Sand and other Materials.—993, T. Palmer, Clamps or Clamping Presses.—1,003, S. Meacock, Indicating the Occupation of Rooms, Closets, &c.—1,173, W. Gillett and H. Moreton, Ventilating Apparatus.—1,501, L. Groth, Improved Water-meter.—1,522, F. Cunliffe, Lavatory Appliance.—1,626, R. Evered, Flushing Cisterns.—1,862, J. Wilesmith, jun., Securing Door, Cupboard, and other Knobs to their Spindles.—1,926, J. Cooper, Joint for Socket-pipes.—1,923, E. Hellawell and H. Bamforth, Apparatus for Regulating, Controlling, and Diverting the "Draughts" of Fireplaces and Chimneys.—1,957, H. Moorwood and J. Watson, Dog-grates and Fireplaces.—1,983, H. Gresham, Stops or Catches for Windows, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

6,431, R. Wenner, Improvements in Water-closets.—7,576, H. Thorpe, Electric Bell Indicators.—13,474, H. Lake, Improvements in Bakers' Ovens.—15,450, E. Murray, Room-to-room Communicator.—6,690, F. Hagen, Improved Gully Trap.—6,691, F. Hagen, Improvement in Water-closet Basins.—896, A. Boult, Improvements in Mallets.—897, A. Boult, Manufacture of Tiles and other Articles from Plastic Materials, and in Apparatus for same.

London Sanitary Protection Association.—The report of Council for the year 1884, presented to the general meeting on the 28th of February, states that

"The total number of houses inspected for the first time by the engineers of the London Association during the year 1884 is 424. Of these, two, or ·47 per cent., were found to have their drains entirely closed up, and no connexion whatever with the sewer; all the foul matter sent down the sinks and soil-pipes simply soaking into the ground under the basement of the houses. In 75 houses, or about 17½ per cent., the soil-pipes were found to be leaky, allowing sewer-gas, and, in many cases, liquid sewage to escape into the houses. In 56, or 13 per cent., the overflow pipes from the cisterns were led direct into the drains or soil-pipes, allowing sewer-gas to pass up them and contaminate the water in the cisterns, and in many cases to pass freely into the house. In 211, or about 50 per cent., the waste pipes from the baths and sinks were found to be led direct into the drain or soil-pipes, thus allowing the possibility of sewer-gas passing up them, instead of these pipes being led outside the house, and made to discharge over trapped gullies in the open air as they should be."

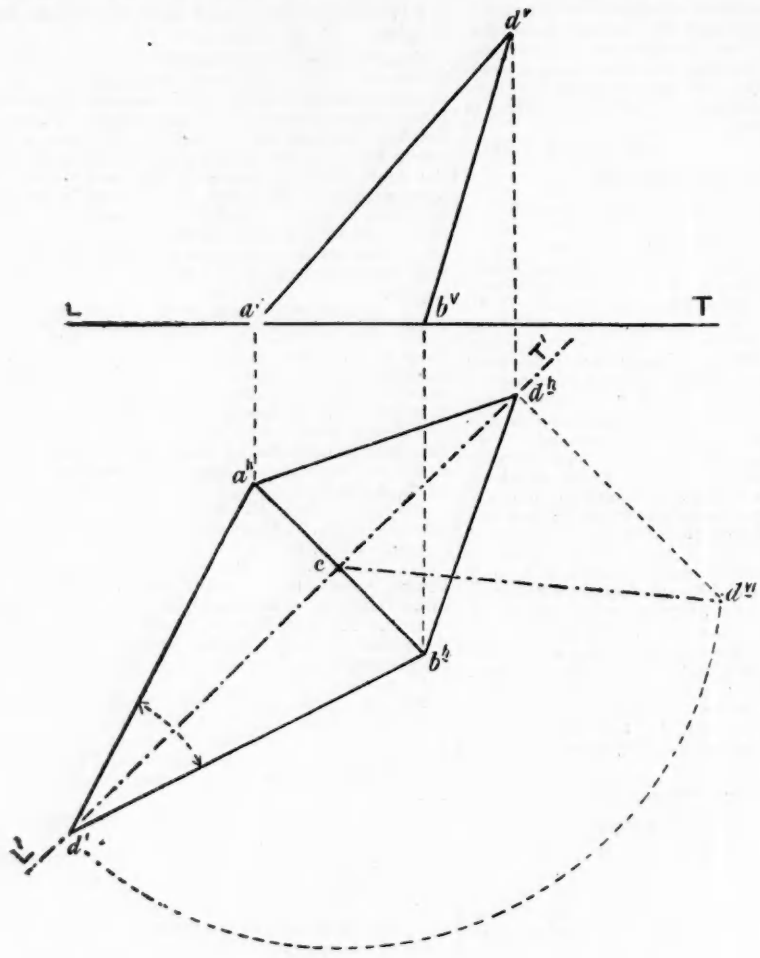


Fig. 25.

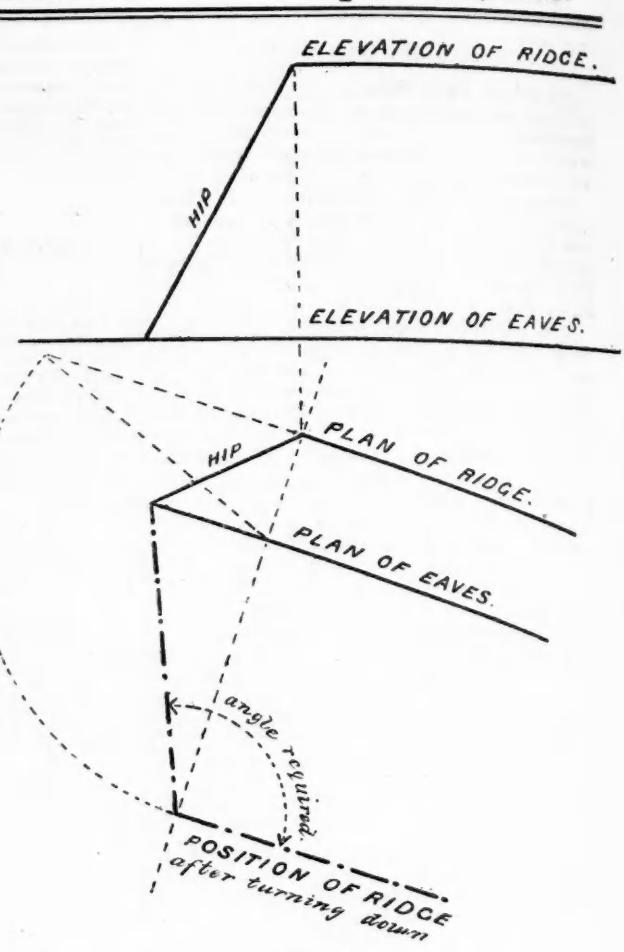


Fig. 26.

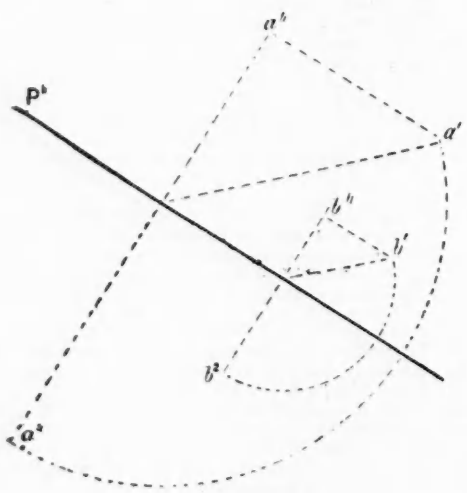


Fig. 28.

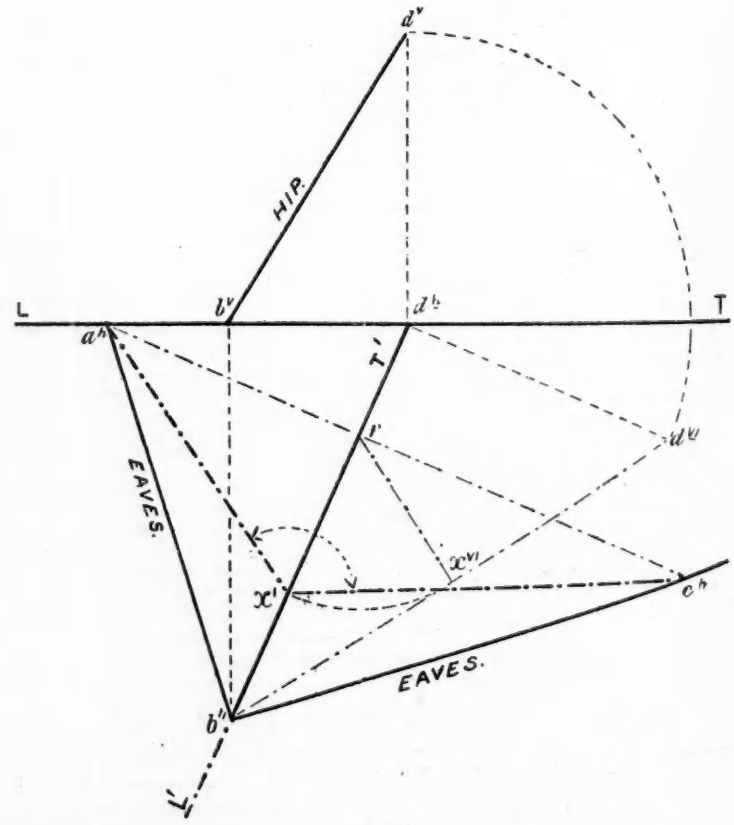


Fig. 27.

The Student's Column.

DESCRIPTIVE GEOMETRY.—V.

WE *may wish to know the angle formed by the meeting of two hips or of a hip and a ridge;* if we do not, the plumber will, when he makes the apron for that part of the roof. This is found by turning down the surface of the roof round any horizontal line belonging to it such as the eaves.

In our diagram we take as hinge of the rotation the eaves a^h, b^h, the apex d of the roof will move in a plane perpendicular to the eaves; we can consider that plane as an auxiliary elevation and draw thereon d^{v1} and the arc it will describe in rotating round c: the angle of the hips is, therefore, a^h, d^1, b^h. (See fig. 25.)

If it be the angle of the hip and the ridge which is required, the turning down of the roof surface is done as before, only we must remember that the ridge once on the turned-down surface remains parallel to the eaves. (See fig. 26.)

If you order ornamental lead at a great distance from the job, say in Paris where they have selections of highly artistic patterns, either the architect or the Paris plumber *will have to find from the drawings, plan, elevation, and section the exact inner angle formed at the meeting of the two roof surfaces.*

In fig. 27 the plan of the eaves is a^h, b^h, c^h, the line $b\,d$ is the hip of the roof. If we intersect the roof by a plane perpendicular to the hip, the angle formed by the intersections of that plane with the roof on each side will be the angle required. The horizontal trace a^h, c^h of that *auxiliary* plane will be perpendicular to the plan of the hip, and if we make an *auxiliary* elevation on the vertical plane which contains the hip, we shall have the vertical trace $r\,x^{v1}$ of our auxiliary plane perpendicular to the hip, the point x^{v1} will be the apex of the angle required: we have only to turn it down round a^h, c^h, as hinge of rotation, and a^h, x^1, c^h is the angle formed by the roof surfaces at this hip.

We may have *to draw on a roof a given figure,* it may be some pattern produced with different coloured tiles, it may be the opening of a skylight. We shall study the most difficult case, that in which the eaves are not parallel to the main elevation; this would happen for the sides of an octagonal roof, for instance.

The method used consists in turning down the surface of the roof on the plan, the eaves serving as hinge of the rotation. Then you draw on the turned-down surface the figure you wish to represent and rotate back the whole of the surface comprising the figure drawn thereon to its

former position. The two following diagrams will make the operation clear.

In the fig. 28 a plane P is given by its horizontal trace P^h and a point a thereon, of which the plan a^h is given and its height equal to $a^h a^1$ is known. If we turn down the plane round its trace P^h, a will come to a^2; suppose you mark on the turned-down plane a point b^2 when you rotate the plane back to its former position, the plan of b will be b^h and its height will be $b^h b^1$.

In the fig. 29 we merely apply the preceding method of finding one point to the four angles

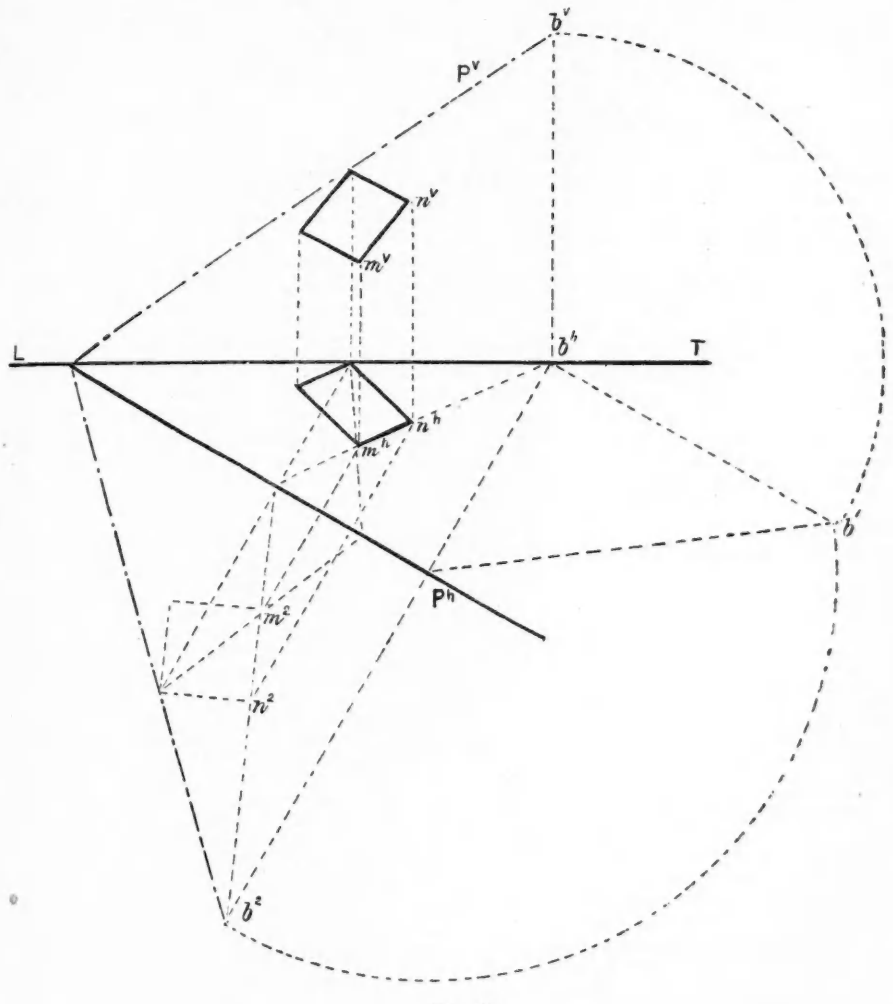


Fig. 29.

of a square of which m–n is the side, the roof surface being given by its eaves P^h and some known point b belonging to its surface. Observe that the operation is not carried out separately with every point, but that simplifications are introduced by delineating the lines which intersect one another to form a square.

The student will do well to place himself various problems of the same kind, and use his ingenuity in solving them in the most rapid manner; by this, he will find this study much less dry than it seems to him when simply reading our explanations, and he will get that mastery of the practice of Descriptive Geometry which he will need when setting out difficult pieces of work.

Books.

Laxton's Builder's Price Book for 1885. Originally compiled by WILLIAM LAXTON. Sixty-eighth edition. London: Kelly & Co., and Simpkin, Marshall, & Co. 1885.

THIS old-established work, which addresses itself to the builder and contractor, rather than to the architect, grows in bulk every year. We notice many additions to the last edition. The prices are given on a very high scale, and are intended for the very best labour and materials. It might be useful to see a list of prices that provided for ordinary contract work. For instance, the drain-pipes are priced at the gross London lists. The price of brickwork is now put at 13*l.* 17s. 6d. per rod, inclusive of profit, but this is too high for ordinary contract work; 2-in. four-panel square-framed doors are priced at 1s. 8d. per foot super.; the 2-in. sashes and frames, double hung, at 2s. 2d.

The prices of American pine joinery are given, and will be found useful, for the best of this kind of work is good, and is found to stand well; there is also a list of Swedish joinery.

The cast-iron columns and girders are priced at a much lower scale than is usually given by price-books, the minimum of 8s. being given for town castings. This is really a low price; we think wrought-iron chimney bars at 30s. per cwt. very high, and the rolled joists are also high. Again, the wrought-iron welded gas or steam pipes are put at the gross prices given by the makers in their lists; we think this is high, even to include labour and profit.

There is such an enormous number of prices contained in the work that it is impossible to do more than select a few as we have done. They are formed, it seems to us, on one basis, and, as we have already said, they are intended for the very best work and material and a fair profit added, so they must be used with thought, and the nature of the work being priced must be taken into consideration when they are used.

There is an interesting chapter on sanitary work and drainage that will be found very useful to those who are not well experienced in these matters.

The regulations and fees for hoards and scaffolds within the City of London form a useful addition, and also some notes as to rules necessary for the use of those desiring to obtain the sanction of the Metropolitan Board of Works to the erection of furnace chimney-shafts; additional law decisions are given, the list of patents granted is added to, and the book altogether is a very useful and complete one, containing, as it does, outside its enormous list of prices, a vast amount of useful memoranda and information for all those concerned in building operations.

The Sixth Annual Building Trades Exhibition at the Agricultural Hall, Islington, will be opened on Monday, the 16th inst., and will remain open for a fortnight, closing on the 28th.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

FEBRUARY 23.

By MULLETT, BOOKER, & Co.

Bayswater—63, Portobello-road, freehold stabling	£730
Hyde Park—The lease of 44, Porchester-terrace, 6 years	130

By WAGSTAFF & WARMAN.

Lea Bridge-road—6 Essex Villas, 65 years, ground-rent 12*l.*	205

FEBRUARY 24.

By BROAD, PRITCHARD, & WILTSHIRE.

Child's Hill, Hendon—"The Castle Hotel," freehold	3,600

By C. & H. WHITE.

Lambeth—Improved ground-rent of 35*l.* a year, term 27 years	380
Nos. 46, 47, and 48, Lower Marsh, term 26½ years, no ground-rent	2,070
No. 9, William-street, 26½ years, no ground-rent	310
Improved ground-rent of 67*l.* 17s. 9d. a year, 26 years	645
Newington—155 and 156, Great Dover-street, 18 years, ground-rent 6*l.* 16s.	460
Montague-square—Improved ground-rents of 40*l.* a year, 22 years	435

By ALFRED RICHARDS.

Commercial-road, E.—54, Anthony-street, 16 years, ground-rent 2*l.* 11s.	180

By DEBENHAM, TEWSON, FARMER, & BRIDGEWATER.

Notting-hill—ground-rent of 105*l.* a year, reversion in 57 years	3,440
Ground-rent of 24*l.* a year, reversion in 60 years	550
Ground-rent of 25*l.* a year, reversion in 57 years	620
Islington—22, St. James's-street, 40 years, ground-rent 5*l.*	370

By A. WALTON.

Peckham—3 and 5, King's-road, 80 years, ground-rent, 10*l.*	540

By FLEURET & SON.

Commercial-road, E.—Nos. 45 and 47, freehold	1,950

By REYNOLDS & EASON.

Hackney—2, 3, and 4, Heslop-place, 9 years, ground-rent 9*l.* 9s.	145

By G. G. FLINT.

Commercial-road, E.—2 to 19, Havering-street, freehold	6,000
Nos. 422 to 434 even, freehold	7,530

FEBRUARY 25.

By DAVID J. CHATTELL.

Pentonville—37, Claremont-square, 27 years, ground-rent 8*l.* 8s.	580

By S. HERRICK.

Lewisham—7, Church-terrace, freehold	160
No. 33, Thurston-road, 78 years, ground-rent 2*l.* 10s.	215
Islington—56, Hemingford-road, 53 years, ground-rent 10*l.*	300
No. 71, Rhodes-street, 58 years, ground-rent 6*l.*	250
No. 72, Albion-grove West, 54 years, ground-rent 7*l.*	3 0
No. 48, Albion-grove West, 59 years, ground-rent 7*l.*	380

By R. TIDEY & SON.

Kingsland—134, Tottenham-road, 36 years, ground-rent 4*l.*	265

By E. ROBINS & HINE.

Wandsworth Common—"Heath Villa" and "May Villa," freehold	1,215

By PHILLIPS & DYER.

Holloway—17 and 19, Eden-grove, 11 years, ground-rent 15*l.*	210
Islington—33, Cloudesley-square, 16 years, ground-rent 7*l.*	265
Camden Town—52, St. Paul's-crescent, 65 years, ground-rent 5*l.*	380
No. 20, Cantelowes-road, 65 years, ground-rent 10*l.*	600

By G. G. FLINT.

Stepney—436 to 450 even, Commercial-road, freehold	7,355
No. 27 to 40, Bower-street, freehold	4,780
No. 1 to 8, Bower-street, freehold	3,160
No. 452, Commercial-road, freehold	1,080

FEBRUARY 26.

By EDWIN SMITH & Co.

Haverstock Hill—5, Queen's-crescent, freehold	850

By Messrs. FLOOD.

Paddington—20 and 26, Lanhill-road, 78 years, ground-rent 17*l.*	1,125
No. 96, Shirland-road, 96 years, ground-rent 10*l.*	560

By NEWBON & HARDING.

Canonbury—20 and 22, Marquis-road, 62 years, ground-rent 20*l.*	1,280
Dalston—102, Graham-road, 78 years, ground-rent 8*l.*	440

By C. C. & T. MOORE.

Leyton, Church-road—"Chestnut Lodge," freehold	525
Clapham Common—95, term 14½ years, ground-rent 8*l.* 2s. 6d.	260

By PROTHEROE & MORRIS.

Shadwell, Sage-street—1 and 2, Settle's Cottages, freehold	750
Leytonstone, Queen's-road—"Farnley Villa," freehold	615

By E. STIMSON.

St. Luke's—155, 157, and 159, Old-street, 12½ years, ground-rent 12*l.*	620
King's Cross—38, River-street, 57 years, ground-rent 4*l.*	325
Loughborough Junction—21, Wingmore-road, 80 years, ground-rent 5*l.*	290
No. 95, Poplar Walk-road, 81 years, ground-rent 3*l.* 10s.	275
Wandsworth Common—5 and 6, Spring-terrace, 92 years, ground-rent 8*l.* 10s.	255

By FAREBROTHER, ELLIS, CLARK, & Co.

City—12, Harp-lane, freehold area, 670 feet	2,610
No. 3, Love-lane, freehold area, 2,070 feet	6,800
Nos. 5, 6, and 8, Botolph-alley, freehold	3,470
Blackfriars-road—175, 176, and 177, freehold	3,540
Nos. 10, 12, 14, and 18, Stamford-street, freehold	6,600
No. 16, Stamford-street, and 26, Bennett-street, freehold	2,560
No. 8, Bennett-street, freehold	1,230

Blackfriars-road—Freehold timber-yard, in rear of Stamford-street	£2,400
Nos. 1 and 2, Bennett-street: 1, 2, and 3, Bennett-court; and 1A to 5A, Bennett-court, freehold	1,610
No. 42, Stamford-street, freehold	940
Lambeth—88 to 98, even, Lambeth Walk, freehold	5,040
Nos. 3 and 5, Mill-street, freehold	780
Old Kent-road—23 and 25, Charles Cottages, 54 years, ground-rent 10*l.*	345

FEBRUARY 27.

By BAKER & SONS.

Hanwell—A plot of land, 4a. 3r. 0p., freehold	2,000
Battersea—18 and 20, Orbell-street, 92 years, ground-rent 6*l.*	500

By A. WATSON.

Starch Green—1, Rylett-road, 90 years, ground-rent 8*l.*	520

By HARDS, VAUGHAN, & JENKINSON.

Lewisham, Morley-road—"Athena House," 84 years, ground-rent 2*l.*	1,250
"Grassmere," 74 years, ground-rent 13*l.* 12s. 6d.	620
Nos. 15 to 19 and 21, Lansdowne-road, freehold	1,605
Nos. 3 and 4, Yorke Villas, 74 years, ground-rent 7*l.*	690

MEETINGS.

SATURDAY, MARCH 7.

Association of Public Sanitary Inspectors.—Dr. J. W. Tripe on "Disinfectants and their Sanitary Uses." 6 p.m.

Clerks of Works' Association.—Visit to new buildings in Brook-street, Grosvenor-square. 3 p.m.

Edinburgh Architectural Association.—Visit to Corstorphine Church and neighbourhood.

MONDAY, MARCH 9.

Surveyors' Institution.—Adjourned discussion on "Leasehold Enfranchisement." 8 p.m.

London Institution.—Mr. H. H. Statham on "Architectural Character and Expression." 5 p.m.

Society of Arts (Cantor Lectures).—Mr. J. Hungerford Pollen on "Carving and Furniture." I. (Types and Fashions of the Wood-carvers' Art.) 8 p.m.

Inventors' Institute. 8 p.m.

Leeds and Yorkshire Architectural Society.—Paper by Mr. T. G. Jackson, of Oxford.

Edinburgh Architectural Association.—Mr. W. W. Macfarlane on "The Painter."

Society of Antiquaries of Scotland.—Five communications. 8 p.m.

TUESDAY, MARCH 10.

Anthropological Institute.—Rear-Admiral F. S. Tremlett on "The Sculptured Dolmens of the Morbihan." 8 p.m.

St. Paul's Ecclesiological Society.—Mr. Charles Browne on the "Ecclesiology of the Roman Catacombs." 7.30 p.m.

Institution of Civil Engineers.—Discussion of Mr. Stroudley's paper on "Locomotive Engines." 8 p.m.

WEDNESDAY, MARCH 11.

Architects' Benevolent Society.—Annual Meeting. 5 p.m.

British Museum.—Mr. W. St. C. Boscawen on "Assyrian and Babylonian Antiquities." III.—(The Palace, its Architecture and Ornament.) 2.30 p.m.

Carpenters' Hall, London Wall (Free Lectures to Artisans).—Professor A. B. W. Kennedy on "A Piece of Steel." 8 p.m.

Civil and Mechanical Engineers' Society.—Mr. C. S. Berthon on "Steel Guns." 7.30 p.m.

Manchester Society of Architects.—General Meeting. 3 p.m.

THURSDAY, MARCH 12.

Society for the Encouragement of the Fine Arts.—Mr. C. M. Campbell, M.D., on "Physiology in Art." 8 p.m.

Society of Arts (Applied Chemistry and Physics Section.)—Mr. W. K. Burton on "Recent Improvements in Photographic Development." 8 p.m.

Society of Telegraph-Engineers and Electricians.—(1) Sir David Salomons on "Constant Electro-Motive Force in an Electric Light Circuit." (2) Mr. Andrew Jamieson on "Electrical Definitions, Nomenclature, and Notation." 8 p.m.

Parkes Museum of Hygiene.—Mr. A. Wynter Blyth, M.R.C.S., on "Household Poisons." 8 p.m.

Society of Antiquaries.—8 p.m.

FRIDAY, MARCH 13.

Institution of Civil Engineers (Students' Meeting).—Mr. William Kidd on "The Blasting and Removal of Rock under Water." 7.30 p.m.

University College.—Professor C. T. Newton, C.B., on "Greek Inscriptions." V. 4 p.m.

British Museum.—Prof. J. F. Hodgetts on "Mediæval English Remains." IV. (Armour.) 2 p.m.

Royal Institution.—Sir Frederick A. Abel on "Accidental Explosions caused by Non-explosive Liquids." 9 p.m.

SATURDAY, MARCH 14.

Architectural Association.—Visit to the Hampstead Hospital and Messrs. Reed's Bottling Stores, Gospel Oak. Assemble at Hospital at 3 p.m.

Miscellanea.

Presentation to Mr. E. R. Robson.—An interesting ceremony took place at the London School Board offices on Saturday last, in the presentation by the members of his staff of a token and address to Mr. Edward Robert Robson, late Architect and Surveyor to the Board, on the occasion of his retirement from that position. Mr. Lewis Wall was unanimously voted to the chair, and was ably supported by Mr. T. J. Bailey, the Architect, Mr. Andrew Young, the Surveyor, and other heads of the Department. The token consisted of a silver casket in the form of a Greek temple, supported by twelve pillars, the address, in the shape of a book, being placed in the top. It is of sterling silver, weighs 85 ounces, and was manufactured by Messrs. J. G. & E. Meyer, of Northampton-square, Clerkenwell.

Scottish Memorial to Archbishop Tait.—The Scottish Auxiliary Committee charged with the erection of the memorial to the late Archbishop Tait have concluded their labours, and the ceremony of handing over the monument to the custody of the Edinburgh University authorities took place on Friday, the 27th ult. The memorial consists of a colossal bust placed in a mural monument, 16 ft. high, which is built into the eastern façade of the Medical School Buildings,—this site having been chosen as that of the house formerly existing in Park-place in which the late Archbishop was born. The monument is designed in the Italian Renaissance of the "Cinque Cento" period, in harmony with the University Buildings, and consists of a pedestal about 5 ft. high, divided into three compartments, in the central one of which is the inscription. On the pedestal rest two columns of polished grey granite, with moulded bases and sculptured capitals in bronze. These support a full entablature, with sculptured panels in the frieze, displaying in the centre the mitre, crosier, and pastoral staff, and in the sides the Christian monogram, I.H.S., and the crest and motto of the Archbishop's family. The entablature is surmounted by a segmental pediment, in the tympanum of which is a bronze panel in bas-relief, displaying two cherubs supporting an Italian shield bearing the arms of the See of Canterbury impaled with those of the Tait family. The bust, which stands upon a moulded plinth over the pedestal, and is set within a semicircular panelled niche, between the columns already described, has been executed in bronze by Signor M. Raggi, London. The monument has been designed and executed under the direction of Dr. R. Rowand Anderson, architect, Edinburgh.

"The Buckingham Theatre."—A Committee of the Metropolitan Board of Works has had under consideration the question of the safety of the building known as the Buckingham Theatre, No. 153, Buckingham Palace-road. The "theatre" is about 107 ft. long, by an average width of 21 ft., and occupies the upper floor of a building, the ground-floor of which is used as a stable. The floor of the "theatre" is of wood, and the joists are not ceiled. The approach is in Buckingham Palace-road, by two doorways, each 3 ft. wide, leading to an entrance vestibule, out of which is a staircase, 4 ft. 5 in. wide. The treads and risers of the staircase are of slate, 1¼ in. thick, and the staircase is enclosed by wooden partitions. The total superficial area of the theatre is about 2,240 square feet. There are no fixed seats, but there is probably room for an audience of about 300 persons. The place was licensed for music in October last by the Justices of Middlesex, but it has not received the Lord Chamberlain's licence for the performance of stage plays. The Committee, after an examination of the drawings made by the Superintending Architect of the Board, and a full consideration of the circumstances of the case, reported that the building is totally unsuitable for use as a place of public entertainment, and it was resolved that the Justices of Middlesex and the Lord Chamberlain be informed accordingly.

The Sunday Opening of Museums, &c.—The Duke of Westminster and the Committee of the Sunday Society have issued invitations to a National Conference with authorities and officers of museums, art galleries, and libraries which have been open in the United Kingdom on Sundays. The Conference has been called specially for the purpose of directing the attention of Parliament to the results which have attended the Sunday opening of museums, art galleries, and libraries in the United Kingdom, and it is expected that representatives will be present from each of these institutions. The Conference will be held in St. James's Hall, on Wednesday, March 25th.

Building Progress in Sydney.—According to the Immigration Agent for New South Wales, there is little or no cessation of building operations in the Australian metropolis, where, during the past year, 521 buildings, including large warehouses, were completed, besides additions to 198 old premises,—numbers about equal to those of 1883. But the list for 1884 includes a larger number of extensive warehouses. "Any visitor must be struck by the large number of fine new structures, as well as by the number in course of erection. The work of construction has been considerably promoted by capital sent from England for investment."

Brighton Recreation and Health Society. We have received the second annual report of this useful society, though its usefulness is apparently hampered by want of adequate support. One of the questions which has engaged the attention of the society has been the proposal to establish a public abattoir in the town. The society having collected a good deal of evidence bearing upon the subject, this was embodied in a circular, and copies were sent to every member of the Town Council. The circular was followed by a special appeal to that body to take up the matter, and, as a result of this, a Sub-Committee has been appointed by the Council to report upon the whole question. The evidence obtained on the various points shows that, where established, the public abattoirs are a great gain to the locality, on the grounds of health, humanity, and public utility. Further attention has been given to the condition of some of the poorer districts of Brighton, and the society has again been represented in connexion with the sanitary cases before the Borough Magistrates. The increased power given to the Corporation officials by some of the sanitary clauses of the Brighton Improvements Bill will, the report says, lessen the need for the work of the society in connexion with the insanitary condition of the courts and slums.

Female School of Art.—The Duchess of Westminster presided at the annual distribution of prizes to students of the Female School of Art, Queen-square, Bloomsbury, on Monday last, the ceremony being held in the Prince's Hall, Piccadilly. The report showed that during the past year 208 students received instruction in various branches of art. Fourteen national awards were gained. Towards the fund for the extension of the school house the sum of 1,484*l.* had already been received, and the adjoining house was now the property of the school. Some structural repairs and alterations had still to be made, and it was proposed to erect a building for class-rooms in the rear of the school. To enable them to meet these additional expenses, amounting to about 4,000*l.*, and to pay off the balance of the debt incurred for the purchase of the house (1,500*l.*), the committee appealed to the public for liberal subscriptions. Sir Philip Cunliffe-Owen moved:—

"That in the opinion of this meeting it is of the highest importance that early possession of the new premises should be obtained, and for this purpose it is essential that the debt incurred to complete the purchase should be paid off, and a further sum of £4,000 raised. In order to effect these worthy objects, the proposal to hold a grand bazaar is approved, and increased donations are solicited."

This was seconded by Mr. George Godwin and passed unanimously, as also were the succeeding resolutions.

The Vital Statistics of the Peabody Buildings.—The vital statistics of the resident population of the Peabody Buildings afford trustworthy evidence of satisfactory sanitary condition. The birth-rate was equal to 44·6 per 1,000, and exceeded by 10·9 the rate for the whole of London. This high birth-rate indicates an age constitution of the population which should give a low death-rate. The recorded death-rate, after correction for the deaths of residents recorded in hospital, was 19·1, and was 1·2 below the general London rate. Infant mortality, measured by the proportion of infants under one year to births, was 138·7 per 1,000, and 13·7 below the mean rate in London. These figures are somewhat more favourable than those recorded in recent years. It is necessary, however, to point out that mortality statistics of improved or model dwellings are of somewhat doubtful value for comparative purposes. The inhabitants of such dwellings consist for the most part of a "selected" population, selected indirectly as being healthy, steady, thrifty, and respectable. *Lancet.*

Incandescent Electric Lamps.—Messrs. Woodhouse & Rawson have just introduced what appears to be a marked improvement in incandescent lamps. One great trouble hitherto with such lamps has been with the platinum loops, which, being more or less fragile, have been very liable to be strained or broken when the lamps are being attached to or detached from the holder. The improvement to which we are referring consists in the provision of a "vitrite" holder, by the use of which there is no strain at all on the platinum connexions. "Vitrite" is described as a vitreous material, perfectly hard and incapable of fusion, except at very high temperatures. The new vitrite holder is adaptable to existing installations.

The "Jamaica Coffee-House."—This celebrated coffee-house, in St. Michael's-alley, Cornhill, is being demolished. It was for many years the head-quarters of those who represented the shipping interest. The old lockers still remain which were used by the City magnates of a past age. A new building is about to be erected on the site, from the designs of Mr. Banister Fletcher, the accepted contract being 7,173*l.* Some record of the past will be kept by painted windows, representing scenes which have taken place within the walls of the building, and the arms of the old City merchants.

Lectures on Carving and Furniture.—The subject of the next course of Cantor Lectures at the Society of Arts will be "Carving and Furniture," by Mr. J. Hungerford Pollen. The course will consist of four lectures, to be given on March 9, 16, 23, and 30. Lecture I. will deal with the types and fashions of the wood carvers' art. Lecture II. will be devoted to the Renaissance; while the subject of Lectures III. and IV. will be the Age of Gibbons, Boule, and that of their successors.

A Hydraulic Door-Spring. — Messrs. Archibald Smith & Stevens, of Leicester-square, exhibited at the Royal Institution *Conversazione*, on Friday evening, February 27, by request, their new hydraulic door spring, which attracted a considerable amount of attention.

Surveyorship, Hendon Local Board.—We learn that there were upwards of a hundred applicants for this appointment. The applications were referred to a committee to report upon to the Board. We have not yet been informed of the result.

Hydrographic Surveying.—At the last meeting of the Institution of Civil Engineers of Ireland, Dublin, the paper read was by Mr. James Dillon, member and past vice-president, "On the patent hydrographic surveying and sounding apparatus used for the preparation of plans, sections, soundings, and charts of sea, canal, lake, estuary, and river beds; also for determinating the rate of silting-up of same when necessary; and for the use of the mariner when navigating shallow waters."

Hydraulic Lifts.—The directors of the Employers' Liability Assurance Corporation, 84, King William-street, E.C., have instructed Messrs. R. Waygood & Co. to fix for them a direct-acting lift worked from the London Hydraulic Power Company's mains.

The Electric Railway at the Alexandra Palace.—The work of making the electric railway from Wood Green Station to the Alexandra Palace, which will be completed before the 30th of March inst., has been commenced, the contractors being Messrs. Wilkinson Bros., of Finsbury Park.

The New Buildings at St. Pancras Workhouse.—On the invitation of the St. Pancras Guardians, the Lord Mayor has consented to open the new buildings on the 13th inst. Mr. H. H. Bridgman is the architect of the buildings.

The Burns Memorial. — The bust of Robert Burns, which has already been placed in Westminster Abbey, will be formally unveiled on Saturday afternoon at four o'clock, when the Dean will be present.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
New Church	Rev. D. D. Jones	Not stated	March 13th	ii.
Restoration of the Young Memorial, Wisbech	The Committee	do.	March 18th	ii.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page
Footway Paving	Whitechapel B. of Wks.	*Official*	March 9th	ii.
Granite, &c., Kerbing, Flints, Slag, &c.	Hendon Local Board	do.	do.	xxi.
Works and Materials	Willesden Local Board	O. Claude Robson	March 10th	ii.
Paving and Curbing Works	do.	do.	do.	ii.
Tar Paving	do.	do.	do.	ii.
New Board School	Thames Ditton Sch. Bd.	R. J. Lovell	do.	xxii.
Paving Works	West Ham Local Brd.	Lewis Angell	do.	ii.
Altering and Enlarging Town-hall	do.	do.	do.	ii.
Science and Art Museum and National Library, Dublin	Com. of Public Works in Ireland		March 12th	ii.
Wood Paving	Fulham Board of Wks.	*Official*	do.	xxi.
Well-Sinking, &c., for Water Supply	Teignmouth Local Brd.	George Crow	March 14th	ii.
Erection of Pumping Engine-House	Ebbw Vale Steel, &c., Co.	*Official*	do.	ii.
Sewerage Works	Clevedon Local Board	do.	do.	xxii.
Wrought-Iron Lattice Girder Foot-Bridge	Sowerby Bridge Lcl. Bd	do.	do.	xxi.
Erection of New Station, &c., Brockley Rise	L. B. and S. C. Ry. Co.	do.	March 16th	xxi.
Sewer Works	Vestry of St. George-the-Martyr, Southwrk	do.	March 17th	xxi.
Works and Materials	Kingston Highway Bd.	T. H. B. Heslop	do.	ii.
Sewering, Paving, &c.	Cor. of St. Helen's	G. J. C. Broom	March 18th	xxi.
Jobbing Masonry Works	Fulham Board of Wks.	*Official*	do.	xxi.
New Post-Office, Folkestone	Com. of H.M. Works	*Official*	do.	ii.
Drainage Works	Fulham Union	do.	March 19th	ii.
Removal of Dust, &c., and Generl Cartge Wks	Finchley Local Board	G. W. Brumell	March 23rd	xxii.
Erection of Two Bakers' Ovens	Managers Met. Asylum	A. & E. Harston	do.	xxi.
Constructing Reservoir	Guildford U. S. A.	*Official*	do.	xxi.
Residence, Farm Buildings, &c.	Edwin Brough	W. Sugden & Son	March 24th	xxii.
Sewage Outfall Works	West Ham Local Board	Lewis Angell	do.	ii.
Works in connexion with the Parish Church, Oldbury-on-Severn	The Committee	Waller, Son, & Wood	March 25th	ii.
New Infirmary	Tonbridge Union	H. H. & E. Cronk	March 27th	ii.
Main Sewerage Works	Maryport Harbour Trustees	H. U. McKie	March 30th	xxii.
Enlargement and Part-Rebuilding St. Mark's Church, Bexhill	The Committee		March 31st	xxii.
Erection of Pauper Lunatic Asylum	West Riding Pauper Lunatic Asyl. Menston	J. Vickers Edwards	do.	xxi.
Sewerage Works	Handsworth Local Brd.	E. Kenworthy	April 17th	ii.
Alterations and Additions to Corset Factory, Market Harborough	R. & W. H. Symington & Co.		Not stated	xxii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Engineer and Surveyor	Merthyr Tydfil Lcl. Bd.	350*l.*	March 18th	xviii.
Assistant Master	West London Schl of Art	120*l.*	Not stated	xviii.

TENDERS.

For pulling down and re-building No. 97, Mortimer-street, Cavendish-square, W. Mr. W. J. Miller, architect, 65, Margaret-street, W.:—

Adams	£2,075 0 0
Bangs & Co.	2,05[illegible] 0 0
Manning	1,956 0 0
Spencer & Co.	1,943 0 0

For the erection of five houses in Tibble's-alley, Peckham, for Mr. Henry Combe. Mr. A. T. Waterfield, architect; Mr. C. L. Cadney, surveyor:—

Reading	£2,600 0 0
Elme & Son	2,480 0 0
Trinick	2,421 0 0
Steel Bros.	2,412 0 0
Wm. Oldrey	2,255 0 0
W. Johnson	2,072 0 0

Tenders for the erection of an infirmary at East Dulwich-grove, Champion Hill, S.E., for the Guardians of St. Saviour's Union. Messrs. Henry Jarvis & Son, architects, 29, Trinity-square, Southwark, S.E. Quantities supplied by Messrs. Franklin & Andrews:—

W. Downs, Walworth	£86,874 0 0
J. Longley, Crawley	86,663 0 0
B. Nightingale, Albert Embankment	86,420 0 0
Colls & Sons, Camberwell	86,164 0 0
G. Shaw, Westminster	83,880 0 0
W. J. Adcock, Dover	83,169 0 0
Bull, Messrs., Clement's Inn	81,000 0 0
Brass & Son, St. Luke's	80,777 0 0
Peto, Bros., Pimlico	79,967 0 0
W. Shepherd, Bermondsey	79,854 0 0
J. T. Chappell, Pimlico	79,294 0 0
Wells, Aldershot	79,000 0 0
Smith & Son, South Norwood	78,996 0 0
Lawrance & Sons, City-road	78,954 0 0
Mowlem & Burt, Millbank	78,880 0 0
Howell & Son, Lambeth	78,560 0 0
Rider & Son, Union-street	78,000 0 0
J. & J. Greenwood, Arthur-street West	77,650 0 0
W. & F. Croaker, Southwark	76,970 0 0
M. Gentry, Stratford	76,750 0 0
Kirk & Randall, Woolwich*	74,571 0 0
C. Wall, Chelsea	71,868 0 0

[Architects' estimate, £80,000.]
* Accepted.

For roads, sewers, manholes, and ventilators at Ipswich, upon the Wherstead-road Estate of the National Liberal Land Company, Limited. Mr. George Pooley, surveyor, 26, Charing Cross, S.W.:—

A. C. Trew, Ipswich	£937 15 0
W. Nicholls, Wood Green	900 0 0
J. C. Trueman, Hackney	845 0 0
J. B. & F. Bennett, Ipswich	825 0 0
T. Adams, Moorgate-street	809 0 0
W. Carter, Anerley	798 0 0
S. Chafen, Rotherhithe (accepted)	715 0 0

For curb and channels for new roads on the Kent and Essex Land Company's West Gravesend Estate. Mr. George R. Cobham, surveyor, Gravesend:—

A. C. Rayner, Gravesend (Cornish granite)	£511 17 6
W. H. Archer, Gravesend (Cornish granite)	500 12 6
W. C. Middleton, Gravesend (Cornish granite)	495 0 0
Adams, London (Newry granite)	438 15 0
Wheeler & Hindle, London (Norwegian granite)	438 15 0
W. & J. R. Freeman, London (Cornish granite)*	427 10 0
Curzon, London (patent silicate)	371 5 0
W. C. Middleton, Gravesend (Cornish granite and rag)	337 10 0
W. H. Bensted & Son, Maidstone (Kentish rag)	337 10 0

* Accepted for curb only.

For the erection of a house in Mersea-road, Colchester. Mr. G. H. Page, architect, Colchester:—

Harden	£250 0 0
Malster	248 0 0
Gladwell	195 0 0
Sansom	190 0 0
Ambrose	185 0 0
Ritt (accepted)	177 0 0

For the erection of Infectious Diseases Hospital at Wellingborough for the Local Board of Health. Quantities by the architect, Mr. E. Sharman:—

G. Henson	£2,884 17 0
E. Brown	2,753 13 0
Harrison & Hacksley	2,753 0 0
R. Marriott	2,683 0 0
J. Underwood	2,646 0 0

For heating apparatus at the New Wandsworth Workhouse. Mr. Thomas W. Aldwinckle, architect, 2, East India-avenue, E.C.:—

Benham & Sons	£765 0 0
Bacon	762 0 0
Grundy	666 0 0
Thames Bank Iron Company	645 0 0
Berry	595 0 0

For the erection of proposed Baptist Chapel, Ferme Park-road, N. Mr. J. Wallace Chapman, architect:—

	In Terra Cotta.	In Bath Stone.
Nightingale	£5,189 0 0	£5,189 0 0
Lewis	5,030 0 0	5,100 0 0
Dove Bros.	4,715 0 0	4,675 0 0
Falkner	4,697 0 0	4,653 0 0
Tarrant & Son	4,597 0 0	4,552 0 0
Nye	4,523 0 0	4,500 0 0
Staines & Son	4,484 0 0	4,464 0 0
Wm. Oldrey	4,466 0 0	4,416 0 0
Taylor & Grist	4,374 0 0	4,351 0 0

For alterations and repairs to the Robin Hood Tavern, Holborn, W.C., for Messrs. Deakin & Crimmen. Mr. Arthur W. Saville, architect, 99, Strand, W.C. Quantities supplied:—

D. Rice	£703 0 0
Bright & Co.	650 0 0
J. Beale	650 0 0
Spencer & Co.	625 0 0
Royal	589 0 0
Freshwater	578 0 0
Searchfield & Son	569 0 0
B. Cook (accepted)	535 0 0

For the erection of house at Surbiton for Mr. Arthur Shepherd. Messrs. Alexander & Gibson, architects, 9, Great James-street, Bedford-row:—

F. & J. Adkins, Surbiton	£2,065 0 0
Bishop, Putney	1,950 0 0
Turtle & Appleton, Wandsworth	1,825 0 0
Scase, Surbiton	1,640 0 0
Gregory & Bence, Hampstead	1,595 0 0
Judd, Kingston (accepted)	1,563 0 0
F. Smith, Wandsworth	1,320 0 0

For new house, Artillery Field Estate, Woodbridge-road, Guildford, for Mr. James Ede. Messrs. Peak, Lunn, & Peak, architects, Guildford:—

Martin, Wells, & Co., Aldershot	£771	15	0
Garnett, Guildford	670	0	0
Downes & Hill, Guildford	630	0	0
Strudwick, Guildford	629	0	0
T. E. Downes, Guildford	600	0	0
Bottrill, Reading	595	0	0
G. & R. Smith, Guildford	593	0	0
Lunn, Guildford	581	0	0
Elliott, Guildford (accepted)	525	0	0
Currington & Peto, Guildford (withdrawn)	445	0	0

For re-building the Lion and Crown public-house, North-street, Guildford, for Mr. William Smith Bramley. Messrs. Peak, Lunn, & Peak, architects. Quantities supplied:—

Garnett, Guildford	£1,259	0	0
Pink, Milford	1,200	0	0
Kingerlee, Oxford	1,180	0	0
Martin, Wells, & Co., Aldershot	1,170	0	0
Bottrill, Reading	1,120	0	0
Nye, Guildford	1,089	0	0
Strudwick, Guildford	1,087	0	0
Mitchell Bros., Shalford (accepted)	1,025	0	0

For alterations and additions to the Watford Water Works, for the Watford Local Board of Health. Mr. E. Easton, engineer:—

Judge & Eames	£715	10	0
J. W. Turner	592	0	0
Andrew & Son	515	0	0
G. & J. Waterman	500	0	0
Halse & Brooks	497	14	6
Noble, Horse Shoe Wharf, Upper Thames-street (accepted)	483	0	0

For constructing roads and sewers on the Waterloo Estate, High-road, Kilburn. Messrs. Ventom, Bull, & Cooper, surveyors, 35, Old Jewry, E.C.:—

S. Barnett	£3,590	0	0
Kearly	2,779	0	0
Nowell & Robson	2,722	0	0
Rogers & Dickens	2,687	0	0
Meston	2,654	0	0
Beadle Bros.	2,500	0	0
Kebble	2,450	0	0
Pizzey	2,446	0	0
Adams	2,427	0	0
Bath & Blackmore	2,300	0	0
C. Killingback	2,250	0	0
Nichols	2,241	0	0
W. Neave & Son	2,220	0	0
G. Felton, Kilburn (accepted)	2,097	0	0

For extension of concrete sea-wall and promenade (602 yards), Bray, co. Wicklow. Engineer, Mr. P. F. Comber, C.E., 37, College Green, Dublin. Quantities taken by the engineer:—

John Best, Leith	£20,580	0	0
Brand & Son, Glasgow	17,733	0	0
W. C. Gault, Ballymena	17,377	0	0
W. J. Doherty, Dublin	16,335	0	0
Robert McAlpine, Glasgow*	12,159	0	0
Robt. Simpson, Dublin	12,015	0	0
B. Brady, Bray	9,721	0	0

[* The tender of Mr. McAlpine (who is the contractor for the first section of the work now in progress) was accepted.]

For general repairs to the Cock and Magpie public-house, King-street, Hammersmith, for Messrs. Fuller, Smith, & Turner, Chiswick. Mr. George More, surveyor:—

Lamble	£164	0	0
Nye	162	0	0
S. Hunt	157	0	0
Page	154	15	6

For building new house, High-street, Acton, W., for the West Middlesex Permanent Building Society. Mr. Edward Monson, jun., architect:—

Jullian & Co.	£1,196	0	0
S. Hunt	1,139	0	0
Penny & Co.	1,095	0	0
Nye	1,089	0	0
Wilkinson Bros.	1,077	0	0
Maton	1,024	0	0
Hooper	987	8	9
Beach	947	0	0
Leyford	947	0	0
Roles	903	0	0

For the erection of two shops and houses, Brixton-rise, for Mr. H. D. Mellish. Mr. R. C. Gleed, architect. Quantities by Léon A. Francis:—

Amuel & Anson	£3,440	0	0
G. M. Green	3,394	0	0
Cooper	3,309	0	0
Smart	3,303	0	0
Beal	3,300	0	0
Green	3,259	0	0
Acke Bros.	3,253	0	0
Moyle & Son	3,250	0	0
Smith	3,187	0	0
Parker	3,138	0	0
Bangs—(Too late)			

For making and fixing sundry joiners' work and fittings at the New Schools, Lower Norwood, for the Guardians of the Poor of Lambeth Parish:—

Atkinson	£258	0	0
Gainsford	229	0	0
Miller	197	0	0
Wood, Harris, & Co., Rural Works, Clapham-road	193	0	0
J. Wood	192	0	0
A. Daniels	188	0	0
J. Higgs	188	0	0
Burch (accepted)	167	0	0
Deacon	160	0	0

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 46, Catherine-street, W.C., *not later than Four p.m.* on THURSDAYS.

TO CORRESPONDENTS.

"Mitre Cut" (we never act on information on important matters of that kind without name and address of writer).—B. & Sons.—T. B.—W. S. (thanks).—W. & R.—J. W.—C. F. H.—A. & Co. (of no possible use to us).—C. L., Paris.—Sanití (no name or address given).—C. A. A.—W. G. S.—G. A. H. (the comparison can hardly be made; the same work could not be executed in both materials. The cost of granite as material would be the lowest; the cost of working would be the highest, but really adequate sculpture-work is hardly possible in granite).—J. A. C.—J. A.—P. (next week).—A. & C. H. (received).—C. J. T. (if you will send the MS. we will look at it).

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

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Addressed to No. 46, Catherine-street, W.C.

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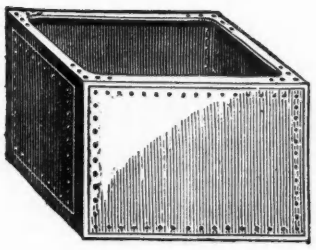

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The CREDITORS of the said Henry Mitchell are requested, on or before the 28th day of MARCH inst. to send by post, prepaid, to Messrs. VALPY, CHAPLIN, & PECKHAM, of 19, Lincoln's Inn-fields, London, W.C. the Solicitors of William Henry Hardy, of No. 5, Great Winchester-street, in the City of London, Chartered Accountant, the Trustee appointed by the said Deed, their Christian and surnames, addresses and descriptions, and full particulars of their Claims, a statement of their accounts, and the nature of the securities (if any) held by them.

All persons having in their possession any property or effects of the said Henry Mitchell are requested to account for the same to the said Messrs. Valpy, Chaplin, & Peckham, by the same date.

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